TURNING THE TIDE
A New Policy For Canada's Pacific Fisheries

THE COMMISSION ON PACIFIC FISHERIES POLICY

FINAL REPORT

Peter H. Pearse, Commissioner

VANCOUVER - SEPTEMBER 1982

COMMISSION ON PACIFIC FISHERIES POLICY

PETER H. PEARSE: COMMISSIONER

His Excellency the Right Honourable Edward Schreyer, P.C., C.C.
Governor General of Canada

MAY IT PLEASE YOUR EXCELLENCY

In accordance with your Order-in-Council of January 12th, 1981, a Commission was issued under the Great Seal of Canada pursuant to the Inquiries Act, appointing me sole Commissioner to inquire into and report upon certain matters of fisheries policy as they apply to Canada's Pacific coast.

I beg to submit my final report herewith.

I have the honour to be, Sir, your
Exellency's obedient servant.

Peter H Pearse

Peter H. Pearse, B.S.F., M.A., Ph.D., R.P.F.
Commissioner

Vancouver
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Preface

Canada's Pacific fisheries are at a crisis point. This year, following two depressed years, the economic circumstances of the commercial fisheries are exceptionally bleak. In addition, there is a growing concern about the precarious condition of many of our fish stocks and increasing anxiety among Indians about their traditional fishing rights and among sport fishermen about their recreational opportunities. Although aggravated by current conditions, the economic problems and other concerns are rooted in fundamental deficiencies in fisheries policy. However, within an improved policy framework, we can turn what is now a bleak and problematical picture into an exceedingly bright one in the future. Our resources are remarkably rich; indeed they are enviable in comparison to those of most other fishing regions. And while some stocks are depressed, they are generally in much better condition than the heavily exploited resources in much of the rest of the world.

Our predominant resource, the Pacific salmon, is truly exceptional: it is one of the world's most highly valued food fish; it affords superb recreational opportunities; and its migrations throughout the coast and far into the waterways of the interior has made it the touchstone of many of the native Indians' cultural and spiritual traditions, which continue to enrich the Canadian social mosaic. In addition to all this, salmon are highly responsive to enhancement. Herring also provide unusually valuable food products; and many other species of fish, shellfish and crustacea are valuable as well.

This report identifies opportunities for reorganizing the commercial fisheries to put an end to their chronic instability and poor economic performance and start them on a healthier course of development, for preserving and enhancing sportfishing opportunities, and for securing Indians' traditional access to fish. These are not just theoretical possibilities; they are attainable through established technologies and regulatory methods, and at a cost that is modest relative to the benefits.

The Commission on Pacific Fisheries Policy, appointed by the Governor General in Council of Canada on January 12, 1981, was charged with the task of finding ways to improve the conditions of Canada's Pacific fisheries. Its terms of reference, reproduced in Appendix A, instruct me, as Commissioner, to investigate and to make recommendations regarding most of the major issues of governmental policy relating to Canada's Pacific fisheries, with the exception of international arrangements. The scope of my inquiry has therefore been wide, including such disparate matters as fisheries resource management and conservation, industrial regulation, sportfishing policy, Indian rights, environmental protection, problems of Yukon, intergovernmental arrangements, administration, enforcement and research. The issues that required investigation are not only very broad but, as this report reveals, are also exceedingly complicated, intertwined, and difficult to unravel. To redesign fisheries policy in a way that will be both feasible and effective in resolving its current deficiencies is a formidable challenge.

The information in this report has been obtained in a variety of ways, the most important being the Commission's public hearings. All those who wished to make a presentation on the matters within the terms of reference were invited to participate in hearings set up in coastal and interior centres in British Columbia and Yukon.

The hearings took place against a background of anxiety about the state of the fisheries and uncertainty about government regulations. Soon after the Commission was struck last year the Department of Fisheries and Oceans announced a series of new restrictions on commercial and recreational fishing. The ensuing debate over these measures, and the way they were implemented, heightened concern about fisheries policy. At the same time, Canada's important negotiations with the United States over a new international accord, relating mainly to interception of Pacific salmon, faltered and raised new apprehensions. And several industrial development projects have recently generated public controversies over their impacts on fish habitat. The concern generated by these issues and the generally depressed economic condition of the industry have created deep dissatisfactions with government regulatory policy, and no doubt account for the high level of interest and participation in the hearings.

One hundred and fifty-one individuals and organizations (listed in Appendix B) were registered participants. These included virtually all commercial and sportfishing organizations, many Indian tribal councils and bands, environmental groups, professional associations of biologists and foresters, industrial organizations, governmental agencies involved in the fisheries and other resource industries, and a large number of individuals.

In November 1981, after the first round of hearings, my Preliminary Report, Conflict and Opportunity: Toward a New Policy for Canada's Pacific Fisheries was published.[1] In addition to recommendations relating to commercial fisheries regulation, that report reviewed all of the other major issues within my terms of reference, providing up-to-date information and identifying problems and possible solutions.

A second round of hearings was then scheduled. Each of these new sessions was devoted to one of eight subject areas: habitat management, salmonid enhancement and aquaculture, Indian fisheries, recreational fisheries, research, licensing inspection and product regulation, enforcement, and administration and consultative arrangements. At each, the Department of Fisheries and Oceans presented a background paper on the issue, and participants could present supplementary briefs concentrating on the changes needed.

In the two rounds of hearings, the Commission received 193 written submissions (listed in Appendix B), which were examined in 67 days of public hearings held in 11 centres in British Columbia and Yukon. The discussions of these briefs and related testimony have been compiled in 14,328 pages of verbatim transcript.

In order to broaden participation in the inquiry, I also held informal meetings in some of the smaller communities that have a significant interest in fisheries. Meetings were held in 16 towns and villages along the coast and in the interior, many of them in Indian communities. These less-structured discussions contributed a great deal to my understanding of local problems as well as to the more general policy issues I was required to examine.

Information was also obtained from a variety of other sources: a number of specialists were employed to gather information and analyze problems; the Department of Fisheries and Oceans, the Department of Environment, British Columbia's Ministry of Environment, and international regulatory commissions provided information and assistance; official studies and reports, as well as academic and other published documents were also used. And finally, information was gathered in informal ways through conversations with fishermen in ports, by tours of fish plants and trips with commercial and recreational fishermen, and by visits to research stations and to traditional Indian fishing camps. Some of this information is contained in the supplementary documents listed in Appendix C.

While I encountered a number of difficulties in organizing and conducting this inquiry, the administrative arrangements with the government in Ottawa proved to be the most frustrating. They have been entirely unsuitable for a Commission of this kind, which by its nature must not only be independent in carrying out its work but expeditious in recruiting staff and carrying out its business. Having to deal with three departments of the federal government, I encountered excruciating delays in obtaining the necessary approvals to hire expert assistance, excessive paperwork, and delays of months in payments to my staff. This has added considerably to the cost of this Commission in both time and money. I emphasize that these difficulties are not attributable to the Department of Fisheries and Oceans in Vancouver, which assisted the Commission at every opportunity, nor to any individual, but rather to the system of financial and administrative control involving the Department and the Treasury Board in Ottawa. This has proven to be an obstacle rather than an aid to efficiency and economy in conducting this investigation.

To design an appropriate policy for the future, and to implement it successfully, the cooperative participation of those who will be most directly affected by it is essential.

> . . . it is the establishment of a common interest, collectively viewed, that is paramount. It is the resolution of conflict and the re-direction of effort toward common interests and goals which will make the system work to the greater benefit of all. Consultation is not the end — it is only one of the means.[2]

This Commission has set the stage for this cooperation. It has induced those with interests in the fisheries to articulate their problems and to suggest policy changes that are defensible in the face of conflicting viewpoints. The interchanges at public hearings have broadened each group's appreciation of the problems of others and tempered uncompromising positions. And coverage of the process by the public media has alerted a broader public to the need and possibilities for policy improvements.

Those involved in the fisheries recognize that these changes must be major if our resources are to be properly managed and if we are to realize the potential benefits they are capable of yielding. In spite of serious differences of views, commercial, sport and Indian fishermen, as well as others with interests in the natural environment and other industries, are not only willing to participate in the next phases of policy change but are anxious to do so.

> The present disarray on the Pacific Coast of Canada is so extreme that the fundamental issues must now be examined, and major solutions identified. We are convinced that such solutions are available, and that they must be implemented in a very short period of time. A commitment is required from all participants to make the necessary and perhaps painful adjustments. . . .[3]

Our goal is to enable our fisheries to realize their full potential contribution to the economic and social welfare of Canadians. From the present vantage point, we have a long way to go, and to reach this goal will be difficult. But the momentum generated by this Commission and the general readiness for change has created an unusual opportunity. The government would be wise to take advantage of it with bold and immediate action.

Vancouver
September, 1982

Peter H. Pearse

FOOTNOTES

1. P.H. Pearse, Conflict and Opportunity: Toward a New Policy for Canada's Pacific Fisheries. The Commission on Pacific Fisheries Policy, Vancouver, November 9, 1981.
2. Fisheries Council of Canada, Exhibit #91, p. 5.
3. B.C. Packers Limited, Exhibit #98, p. 1.

Acknowledgements

I cannot begin to acknowledge all those who have contributed to this inquiry and to the gathering of what is undoubtedly the most comprehensive collection of information and commentary on the Pacific fisheries ever assembled. Scores of organizations and individuals expended great effort in preparing briefs, attending hearings and responding to questions from me and others. Their enthusiastic cooperation in the hearings made the process congenial as well as efficient. Those who followed the Commission's activities, like myself, have been impressed by the high standard of the briefs presented and the constructive discussion of contentious issues at our hearings.

The Department of Fisheries and Oceans prepared a series of documents for the Commission; and officials in the Pacific regional office and in Ottawa responded with consistent helpfulness to our many requests for information. Even though it generated heavy criticism of the Department, this inquiry enjoyed the patient support of the public officials responsible for administering Canada's fisheries policy on the Pacific coast.

A number of expert consultants assisted the Commission with particular problems. Mr. L. Edgeworth gave me the benefit of his exceptionally broad knowledge of fisheries policy and administration in Canada. Mr. E.H. Vernon and Mr. B.A. Campbell also provided information about federal, provincial and territorial policies and about other aspects of the fisheries. Dr. C.J. Walters, Dr. R. Hilborn and Messrs. M.J. Staley and F. Wong assisted in investigating the condition of the fish stocks and certain management problems. And I received advice from Drs. P.A. Larkin, D.A. McCaughran, W.E. Ricker, R.J. Beamish and A.V. Tyler.

Special studies were undertaken by Mr. S.P. Fuller, Dr. S.M. Jamieson, Mr. W.J. Mussell, Mr. T. McDaniels, Mr. W.R. McKay, Miss K.E. Neilson, Mr. D.J. Saxby, Dr. R.W. Schwindt, and Dr. M.P. Shepard. For short periods, the Commission borrowed personnel from the public service, including Mr. G.A. Fraser, Mr. D. MacDonald and Mr. A. Barber of the Department of Fisheries and Oceans, and Mr. F. Blasetti of the British Columbia Department of Industry and Small Business Development. In the early stages of the inquiry Brigadier-General E.D. Danby helped to organize the Commission's affairs and Mr. P.C. Ballem acted as legal counsel. Dr. R.A. Carter edited my manuscripts.

My professional advisors and I were assisted by research assistants employed for a few months each; these were Mr. L.J. Alexander, Miss D.P. Dupont, Mr. V.A. Fletcher, Miss J.A. Friesen, Mr. T. Leadem, Mr. R. Masters and Miss K.A. Sutcliffe.

A Commission such as this depends heavily on its adminstrative and support staff to organize hearings, maintain communications with large numbers of people, keep documents in order and deal with all the problems of preparing and publishing reports. Mrs. L.J. Murdoch, Mrs. M. Parkin and Miss J.A. Herchuk attended to these matters.

Three people played particularly important roles in this inquiry, having participated in virtually all aspects of the Commission's work. Miss H.J. Wilson took direct responsibility for managing the Commission's financial and administrative affairs, organizing the public hearings and much more. Mr. G.K. Bowden directed the Commission's internal research and coordinated the work of our professional advisors. And Mr. R.S. Campbell served as my legal counsel at public hearings and assisted broadly with advice on the matters dealt with in this report.

I must, of course, accept full responsibility for the content of this report. But whatever its deficiencies, it has benefited from the energetic and dedicated team that has assisted me by compiling information, criticizing my ideas, suggesting alternatives and lightening my administrative distractions.

Part I

Objectives

CHAPTER 1

POLICY OBJECTIVES

> *To achieve change is difficult; however, that does not mean it should not be attempted. But to attempt change . . . without a policy . . . is to plow the sea.*
>
> NATIVE BROTHERHOOD OF BRITISH COLUMBIA[1]

We begin with a paradox. We have some of the world's most valuable fish resources, they are capable of yielding great economic and social benefits; yet many commercial fishermen and fishing companies are near bankruptcy, sport fishermen and Indians are preoccupied with declining opportunities to fish, and the fisheries are a heavy burden on Canadian taxpayers.

The problems now facing the Pacific fisheries are numerous, grave and very complicated. They include overfishing, conflicts among users, overexpansion of the fishing fleets, and eroding marine and freshwater habitat. As one group put it at the public hearings, "The problems in the industry boggle the mind. On every hand there is a crisis and a fundamental problem that must be solved."[2] And words like "dilemma," "predicament" and "chaos" were commonly used.

Major and fundamental changes in fisheries policy are needed to correct this situation and to achieve the policy objective stated in this Commission's terms of reference of ensuring "that fish resources and their use make the highest possible contribution to the economic and social development of the people of Canada."

The Need for Policy Reform

In the course of this inquiry I have been offered an astonishing variety of explanations for the problems that afflict the fisheries, ranging from avaricious fishermen to abusers of the habitat, natural predators and incompetent managers. Some support, at least, can be found for all of these. But my inquiry pointed inescapably to deficiencies of government policy: uncertain objectives, weak and outdated legislation, bad organization, contradictory programs and confusion. The cost of this disarray has been staggering. I emphasize this at the outset not to cast blame but rather to explain the context of what follows.

The deficiencies in policy arise primarily from three sources: history, regional differences, and rapid change which has overtaken the government's rate of response.

The present complex regulations, which govern virtually every fishing activity, have resulted from a long succession of governmental responses to particular problems at particular times. As a result, regardless of the effectiveness of the individual measures in serving their intended purposes, the policies are neither coherent nor well suited to modern needs.

Related difficulties have arisen from the necessity of adapting national fisheries policy to suit widely differing regional conditions. Much of the legislation and administrative structures have been designed to meet the needs of the Atlantic, the Great Lakes, and other inland and northern fisheries. The resources, patterns of utilization, economic, social and political circumstances of these areas are different from those of the Pacific. Thus, the regulatory arrangements and administrative structures are often unsuitable for the west coast. Moreover, Parliament, ministers and federal public servants must divide their attention among the various regions and weigh the needs of the Pacific fisheries against those of other regions.

This is not to say that the Department of Fisheries and Oceans has been unresponsive to the problems of Pacific fisheries. Indeed, the last dozen years have seen remarkable changes in their regulation and management. But these innovations have taken place in a piecemeal fashion without a clearly articulated policy objective to guide them. The result has been unpredictable and inconsistent regulation.

The lack of cohesive, consistent and forward-looking policies and programs with respect to fisheries management, enhancement and environmental protection is the single most important criticism of the Department of Fisheries and Oceans' activities on the Pacific coast. Participants in the Commission's hearings repeatedly characterized the Department's policies as being passive or reactive rather than purposeful:

> The present fisheries management system on the Pacific Coast can best be described as *reactive*; that is, it functions primarily without a planning philosophy and is subject to the planning strategies of other, often competing, resource sectors and fishing interests. Thus, priorities for traditional fisheries management activities (enforcement, regulation, habitat protection, etc.) are usually set by the activities that triggered the reaction in the first place and not through deliberate or active fisheries management goals or planning. It is obvious to us that fisheries manage-

> ment and fish will continue to lose under a continuation of the reactive system.[3]

> At present, who amongst us can truthfully say what is the objective of the fisheries?[4]

> What has been lacking is a comprehensive long-term plan that specifies particular goals. . . .[5]

> The myriad of special problems that are facing the Pacific fisheries today . . . have arisen from a lack of policy and firm practices. . . .[6]

Another frequent complaint was that policy decisions are often poorly documented and fail to demonstrate that those who promulgated the policy proposals have an adequate understanding of the issues. Policies presented are often quickly changed apparently in light of facts that were not taken into account during policy formulation.

The cut, chop and change approach has cast doubts on the competence of Departmental staff, has led increasingly to a lack of public confidence in the Department's capacity to manage the resource and has opened the administration to partisan pressure from groups who know that Departmental policy statements can be changed if enough protest is raised.

This lack of direction has been a source of frustration to fishermen attempting to plan their affairs in an orderly way.

> One plea often heard from processors, fishermen, recreational and other interests is for a consistent and long-run policy by government. What government calls "creative ad hocery" in policy formulation continuously frustrates those who are required to make decisions in the investment of their finances and labour in the industry. It is one thing to change the rules of the game and it is quite another to keep moving the goal posts.[7]

In addition, the credibility of the government's policy making in recent years has been repeatedly undermined by announcements and decisions that are not acted upon. Examples, discussed later in this report, include commitments to devote licence fee increases to fleet reduction; to eliminate subsidies on vessel construction; to levy charges to recover the cost of salmonid enhancement; and repeated declarations that royalties would be levied on salmon this year. Not all these changes were welcomed by those who would be most affected, but the fact that they were not acted upon destroys confidence in the government's dedication to fisheries management.

Fisheries authorities must, of course, retain some flexibility because of the unpredictability of fish stocks, economic conditions and other factors; but the uncertainty about regulatory intervention must be minimized and the long-term goals and methods to be used in achieving them made clear.

A clearly articulated policy is also required by the users and regulators of other resources. Because the fish resources of the Pacific coast, particularly salmon, are so affected by other activities, fisheries objectives must be specified, at least in broad terms, in order to assess whether they can be reconciled with developmental plans for other resource industries. This is essential, also, for those who manage the fisheries; otherwise they can only guess at the criteria they should use in making decisions which inevitably leads to inconsistency and criticism. Finally, articulated policy objectives provide the necessary framework for designing appropriate and consistent regulations and administrative procedures.

Policy Objectives

I present here the general objectives that provide the framework for my recommendations in subsequent chapters. For the most part, these objectives build upon the broad policy goals set out in my terms of reference, reproduced in Appendix A.

Resource conservation Fisheries policy must first and foremost ensure that the resource is properly protected and, whenever advantageous, enhanced. This obviously calls for careful regulation of the level and form of harvesting. Equally important, it calls for the protection of the freshwater and marine habitat upon which our major stocks depend. In addition, it implies a need for institutional and financial arrangements that will allow us to take advantage of opportunities for enhancement. And finally, it requires sufficient data and research to ensure that all these activities are carried out effectively.

Maximizing the benefits of resource use This means ensuring that the resources available for harvesting "make the highest possible contribution to the economic and social development of the people of Canada, especially of those resident on the Pacific coast of Canada, recognizing that this contribution may be realized in economic, recreational and other social forms."[8] This requires that the resources are allocated to those who can make the most valuable use of them and that whoever uses the resources does use them in the most beneficial way.

The first requirement is the most difficult to meet. Because of the common property nature of the fisheries and the need to constrain the total catch within biological limits, various groups that compete for the catch are preoccupied with their shares; this gives rise to the pervasive allocation problem, and is the source of "gear wars." Since the values generated by commercial, Indian and recreational users are so different, solutions to this problem call for social and cultural as well as economic judgements. The second requirement implies that the commercial fishery will take its catches efficiently, without the wasteful use of labour and capital in overexpanded fleets that now plague the industry; that sportfishing values will be preserved by appropriate regulation; and that Indians will use their catch in the most beneficial way.

An acceptable fisheries policy must also take account of prevailing concepts of fairness in resource allocation even though they are typically difficult to reconcile with one another and with efficiency.

Economic development and growth My terms of reference direct me to make recommendations toward ensuring that the "vigor of the fishing industry is maintained and advanced, and its structure, ownership and control is consistent with industrial efficiency." The goal of promoting economic development and growth embodies at least two supplementary objectives:

i) To improve incomes in the fisheries. Returns to labour and capital are typically low and unstable; much better returns are potentially attainable by a rationalized industry.

ii) To develop the economic opportunities of coastal communities and Indian people. My terms of reference draw attention to both the social and economic contribution of fish resources. These are closely related in the fishing communities and Indian settlements along the coast and in the interior of British Columbia and Yukon. My recommendations regarding licensing arrangements are aimed at improving the economic base and social stability of these communities.

Social and cultural development Since fisheries policy bears heavily on certain groups, it should be designed to be consistent with, if not promote, public objectives with respect to those groups. In this report, social concerns influenced my recommendations in several ways. In addition to the special needs of coastal communities, I have taken into account the special economic problems of Indians and their unique dependence on fish for nutritional needs and cultural activities. I have also taken into consideration the need to preserve recreational opportunities and to protect the commercial fisherman's lifestyle.

> In these strained times, we should remember that it is often the varied and colourful user groups within the industry, and not just the rich fish stocks and their beautiful environment, that make this industry one of the most satisfying to be a part of.[9]

Accordingly, in making my recommendations I have taken pains to ensure that fishermen will not be arbitrarily excluded from the industry, that they will be able to participate in a freely competitive industry and that they will be fettered no more than necessary by regulatory control.

This does not mean that I agree with those who advocate a return to former practices, older technologies and an earlier way of life. Although I believe in learning from past experience, I do not believe that the fisheries of past decades offer a suitable model for the future. Change is not only inevitable but also desirable. But new policies must be designed so that they can be implemented with minimum dislocation of those who have established positions in the fisheries.

Returns to the public My terms of reference instruct me to make recommendations to ensure that the economic returns from fishing accrue to fishermen to the extent that they represent "fair and reasonable returns to commercial fishing enterprises...." Beyond that, the returns should accrue to the Crown, through "charges levied by the Crown for rights to fish...consistent with the value of resources recovered...."

At present, the fisheries are a heavy burden on taxpayers, and relatively few commercial fishermen are enjoying earnings in excess of "reasonable" returns to their labour and capital. But fleets better adjusted to the available resources could undoubtedly yield very substantial net gains. My recommendations for rationalizing the fishing fleets and improving their economic performance are therefore coupled with recommendations to capture some of the gains for the public.

Flexibility One of the most conspicuous characteristics of the fisheries, especially the commercial fisheries of the Pacific coast, is their susceptibility to rapid change — change in resource abundance, in markets, and in fishing technology and effort. In recent decades major fisheries have suddenly emerged, others have disappeared, and the commercial and sportfishing fleets have been transformed in their size and structure. Although the forms of future changes are unpredictable, we can assume that change will continue. Thus, in order to avoid the reactive changes in policy that create an environment of uncertainty and instability, policy must be designed to be resilient and durable in the face of continuing shifts in the external environment. This is an important concern in my proposals for redesigning all types of fishing licences.

Administrative simplicity Obviously, a successful policy must be amenable to administration and enforcement. In the past, the Department of Fisheries and Oceans has often found itself with insufficient manpower or information to administer its policies effectively or to enforce them consistently. In many cases the resources available for administration and enforcement are too meagre; but frequently the effectiveness of management and regulation could be improved by adopting different approaches, ones that conflict less with private incentives and are more conducive to self-regulation. As far as possible, I have recommended regulations that do this.

Conflict, Vested Interests and Inertia

While those involved in the fisheries generally recognize that major changes are essential and urgent, they are apprehensive when particular proposals are advanced. This apprehension is rooted primarily in the environment of conflicting interests that embroils the fisheries. To effect constructive change, this special characteristic of the fisheries must be recognized and dealt with.

Conflict has characterized the Pacific fisheries from its beginnings. Hostilities have existed between various sectors of the commercial fishery, Indian and recreational user groups, between fisheries interests and other industrial activities, between federal and provincial governments, and between Canada and foreign nations. The continuous conflict can be traced to a number of causes. Undoubtedly, the most important is the common-property characteristic of the resource, which distinguishes it from most other natural resources. Since all groups draw from the same pool of resources, they compete with one another to protect and increase their shares. The inevitable conflicts are aggravated by the relatively low incomes and recurrent economic stress associated with the fisheries.

Under pressure from users, the government has often intervened to protect one user group from another. The measures taken have sometimes created obstacles to efficient allocation and use of the natural resources, and produced a regulatory morass which cannot be reconciled with any logical long-term objectives. Moreover, few have had the desired result of eliminating conflict for long.

Conflict arises from other sources as well, from the international problem of shared stocks and interceptions, overlapping constitutional responsibilities, and the impact of other industries on the fish habitat.

In addition to conflicting interests, vested interests pose an obstacle to introducing changes. The strongest resistance to regulatory reform typically comes from the regulated groups because they have adapted themselves to the prevailing system.

Because of these conflicting and vested interests, policy changes will usually benefit some at the expense of others. Thus, politicians and resource managers have found it difficult to make the major reforms needed. The result is a profound inertia in the fisheries, a resistance to major change in spite of general agreement that worsening circumstances have made such changes essential.

For these reasons, I have gone into great detail in recommending changes. My concern is to lay out a plan of reform that states clearly what particular measures are proposed and what their impacts would be on different groups. The kind of policy changes that I propose in this report will call for the concerted attention, for some time at least, of all the players — the fishermen, processors, competing users of the habitat, the public service and the legislators. If this is forthcoming, the effort will be richly rewarded.

FOOTNOTES

1. Native Brotherhood of British Columbia, Exhibit #198, p. 42.
2. Pacific Coast Salmon Seiners Association, Exhibit #76, p. 8.
3. American Fisheries Society, Exhibit #148, p. 12.
4. D. Pepper, Exhibit #197, p. 3.
5. Native Brotherhood of British Columbia, Exhibit #198, p. 2.
6. B.C. Packers Limited, Exhibit #98, p. 1.
7. The Fisheries Association of B.C., Exhibit #63, p. 36.
8. Terms of Reference, Appendix A.
9. D. W. Ellis, Exhibit #188, p. 14.

Part II

Resource Management and Development

CHAPTER 2

THE RESOURCES

Our basic thrust is that fish and their stock strength are the important issues. Without fish we have no fisheries, and without a sound biological basis and a positive goal-oriented planning philosophy for their management, we have no guarantee for a long-term fish supply.

NORTH-PACIFIC INTERNATIONAL CHAPTER OF THE AMERICAN FISHERIES SOCIETY[1]

Fisheries policy must begin with the resource base. So it is appropriate that the first of several issues identified for investigation in the Commission's terms of reference is "the condition of the stocks of fish within Canada's jurisdiction off the Pacific coast, current levels of utilization and their relationship to optimum rates of use."

The initial public hearings revealed a great deal of uncertainty regarding data on fish stocks, which sometimes impeded informed discussion about appropriate policies and the impacts of various options. Accordingly, the Commission made a special effort to investigate the status of the fish stocks and its findings are presented in this chapter.

PRODUCTION AND POTENTIALS

To provide some perspective on the significance of the various species, Table 2-1 shows recent catch levels for the important categories of fish off the Canadian Pacific coast and our estimates of their maximum sustainable yields. The catch data include the Canadian catch in the commercial, sport and Indian fisheries. (The catch does not necessarily reflect production from Canadian stocks because Canadian fishermen make significant interceptions of fish produced in United States waters and *vice versa.*)

The dominance of salmon in Canada's west coast catch is readily apparent, as is the significant shortfall in the current catch of salmon from potential levels. Herring, which have shown even more erratic levels of yield, are second in importance, and current catches are also far below potential levels. These two fisheries dominate the total yield. The catch figures are averages for recent years, and do not reflect the volatility of fisheries on this coast, particularly salmon and herring.

Table 2-1 Current and potential yields of the major species of fish

	units	current annual catch	maximum sustainable yield
salmon	millions of pounds	155[a]	300 - 600
sockeye		36	
chum		32	
pink		37	
coho		28	
chinook		22	
herring	thousands of metric tons	54[b]	140-200
halibut	millions of pounds	8[c]	15
other groundfish	thousands of metric tons	29[d]	35-105
shellfish and others	millions of pounds	14[e]	24+

[a] Includes commercial, sport and Indian catches, average for the years 1971 to 1980.

[b] Average for the years 1971 to 1980.

[c] Catch by Canadian fishermen only, average for years 1977 to 1980.

[d] Average for the years 1976 to 1980.

[e] Average for the years 1976 to 1980. Oyster production of 5.65 million pounds is excluded because it is mainly a mariculture product.

Sources: The catch statistics provided were compiled from background papers prepared for this Commission. Maximum sustainable yields were estimated by the Commission's researchers.

The total yield has remained fairly stable over the past three decades, but the composition has changed markedly: herring production collapsed dramatically and then recovered; salmon stocks have had a mixed pattern of declines and recoveries; halibut stocks have declined; and a number of minor fisheries have expanded.

The wide ranges in the estimated sustainable yields reflect the quality of the data available for analyzing the status of our fish resources, which varies a great deal and in some cases is very weak. For some species we have good historical records of catches and consistent monitoring programs aimed at population assessment. For others, especially some of the salmon stocks, data necessary to make accurate estimates of potential productivity are meagre and inconsistent. Thus, in many instances, our best estimates are imprecise. The research needed to overcome this inadequacy of information is discussed in Chapter 6.

SALMON

The five species of Pacific salmon are by far our most important fishery resource in both quantity and value. While they have been known by a variety of common names, they are referred to in this report as sockeye, chum, pink, coho and chinook. These five species differ in important respects including their productivity, dependence on freshwater habitat, size, behaviour and susceptibility to fishing gear, longevity, quality characteristics, and markets.

Salmon have been used by native Indians from time immemorial, and they have supported an industrial fishery for more than a century. Salmon became the region's second export item (after furs) when the Hudson's Bay Company began exporting salted salmon from Fort Langley on the Fraser River in 1830. The first commercial cannery in British Columbia began operation in 1870, also on the Fraser River. Canneries had expanded throughout the coast by the turn of the century, as had the exploitation of salmon stocks.

Until 1903 any variety other than "red" salmon (sockeye, chinook or coho) was rejected by the canners. But because salmon runs were poor in 1903, canners began processing the prolific pink and chum salmon. Their use increased sharply in 1911 in response to a disappointing catch of Fraser River sockeye and increased demands for canned salmon. Since then, pinks and chums have held an important place in the commercial salmon fishery.

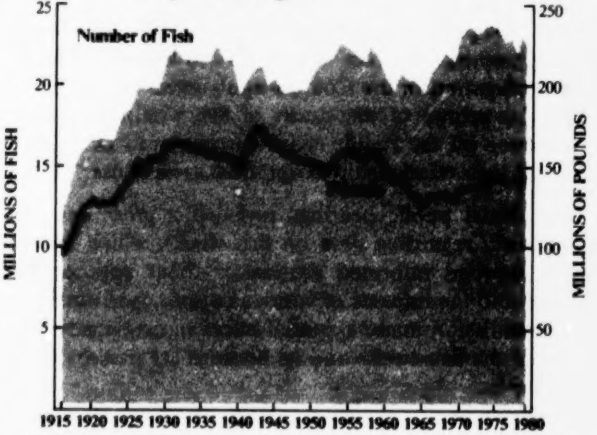
Table 2-2 indicates recent catch levels in the commercial, sport and Indian fisheries. (Because Canadian fishermen make significant interceptions of salmon produced in United States waters, and *vice versa*, the catches do not reflect production from Canadian stocks exclusively.) These data reveal a number of significant facts: the commercial sector dominates the catch, taking 93 percent of the total; net gear takes almost all the sockeye, pinks and chums, while troll gear takes most of the coho and chinooks; the sport fishery takes a significant share of chinook and coho and little else, and accounts for about 4 to 5 percent of the total catch; the Indian fishery accounts for about 2 percent and is directed primarily at sockeye.

Stock Trends

To accurately measure the salmon stocks produced in Canadian waters requires adding together the harvests in the commercial fisheries and adjusting the total for foreign fish, interceptions by foreign fleets, catches in the Indian and sport fisheries, and escapements. We are not able to measure these various components of the stocks with equal reliability even in recent years, and for earlier periods some of the data are unavailable. Nevertheless, some long-term trends can be inferred from the records of commercial landings.

Figure 2-1 depicts commercial salmon landings by Canadian fishermen since 1915, measured by the number of fish and the number of pounds. Both are plotted (using the best information available) in terms of their moving 10-year average in order to smooth the wide fluctuations between cycles and years.

Figure 2-1 Commercial landings of all salmon in numbers of fish and landed weight since 1915, in ten-year averages.[a]



[a] The figure plotted for each year is the average of landings recorded in that year and the preceding nine years.

Sources: See footnote 3.

Table 2-2 The catch of salmon by sector

	commercial fishery						sport fishery		Indian fishery		all fisheries
	seine		gillnet		troll						
	thousands of fish[a]	percent	thousands of fish[a]	percent	thousands of fish[a]	percent	thousands of fish[b]	percent	thousands of fish[a]	percent	thousands of fish
sockeye	2,003	35	3,045	53	363	6	0		377	6	5,788
chum	1,328	48	1,341	49	21	1	0		59	2	2,749
pink	6,380	69	1,421	15	1,408	15	25	.5	37	.5	9,271
coho	492	12	447	11	2,550	61	615	15	55	1	4,159
chinook	65	4	136	8	1,122	66	355	21	32	2	1,710
all salmon	10,268	43	6,390	27	5,464	23	995	4	560	2	23,677

[a] 1971 to 1980 10-year average.

[b] Most recent estimates.

Sources: See Footnote 2.

The number of fish landed reveals no distinct long-term trend. Landings in the 1930s averaged just under 20 million fish, and in the 1940s and 1950s just over 20 million. Since then they have increased slightly to average 23 million in the 1960s and 22 million in the 1970s. The rise in the last two decades can probably be credited largely to increasingly stringent restrictions on the commercial fishery for most species. These restrictions, introduced for many stocks in the early 1960s, and the more precise regulation of some stocks — particularly Fraser River sockeye and pinks placed under management of the International Pacific Salmon Fisheries Commission — allowed increased escapement, which was critical to stock expansion.[4] In addition, more intensive habitat protection and conservation efforts begun in the 1960s; and the early fishways, hatcheries and spawning channels, have undoubtedly contributed to the rise to some extent.

The historical record of pounds of salmon landed reveals some interesting fluctuations. Average landings were relatively stable during the 1930s, 1940s and 1950s at about 150 million pounds per year. Then a noticeable decline occurred in the 1960s, when the average fell to 137 million pounds. In the 1970s the average recovered to 142 million pounds.

While the *pounds* of fish landed declined during the 1960s, the *number* increased. This can be explained partly by the declining average size of all species except sockeye taken in the commercial fishery.[5] This is believed to reflect genetic responses to continuous fishing with nets that tend to take a higher proportion of the larger fish from most stocks. It could also be due to the increasing proportion of the catch being taken by troll vessels; the average age and size of chinook and coho caught with troll gear has apparently been declining since the 1920s.[6]

Analyses of the catch and escapement data that are available for the last two or three decades, together with the longer-term information on catches, allow us to make some observations about trends in stocks and potential yields. The Commission, with the help of expert advisors, has made these analyses for each salmon species by major production areas. The detailed findings relating to present and potential catch and escapement from these stocks are presented in Appendix D, and are only briefly summarized here.

Sockeye Landings of sockeye historically were substantially higher than they have been in recent decades. (See Figure D-1, Appendix D.) Fraser River stocks, which have contributed over half of the total sockeye catch in the 1970s, were devastated by the disasters at Hells Gate in 1913 and 1914. Fishways to improve the upstream passage of sockeye at Hells Gate began operating in 1945, and Fraser sockeye stocks recovered from an average annual abundance of 3.1 million fish in the 1914-1949 period to 5.5 million in the 1950-1980 period.[7] Since 1940, Fraser sockeye have been managed by the International Pacific Salmon Fisheries Commission.

Catch and escapement analyses show that stocks are stable or increasing in all areas except for the central coast region and Rivers-Smith Inlets, where stocks have been declining. Strict controls have been placed on fishing for the Rivers Inlet stocks, however, and there are encouraging signs that the decline is being reversed.

The optimum average annual catch of sockeye, coastwide, is estimated to be some 11.1 million fish, 4.1 million greater than the 7.0 million currently taken. (This number is greater than that given in Table 2-2, which applies to a different period.) (For present and potential catch and escapement data broken down by area, see Table D-1, Appendix D.)

Chum Chum landings declined throughout the 1950s and the first half of the 1960s. Only recently has it been recognized that chum salmon are much less productive than other species and thus can sustain a catch of only a small fraction of the total stock. The persistent decline is believed to have resulted from excessive harvesting throughout most of this century. Recovery began in the late 1960s on the south coast — the most important area — after the commercial fishery had been severely restricted to allow increased spawning escapements.[8] (See Figure D-2, Appendix D.)

Analyses show that Fraser River stocks are now increasing significantly. In most other areas the stocks appear to be stable or increasing slightly except for the northwest Vancouver Island area where a recovery, which began in the late 1960s, has not been sustained, and the southern Queen Charlotte Islands area, where a decline has persisted since the mid 1960s.

Analyses of current and optimum chum salmon yields indicate that current catches, which average just under 1.5 million fish, could be more than doubled to 3.2 million fish or more. Almost half of the potential for increased chum harvests lies in the Fraser River stocks, but in all areas the optimum is significantly greater than current catches. (See Table D-2, Appendix D for details.)

Pink The pink salmon catch has varied widely from year to year due in part to its two-year cycle and in part to fluctuations in population sizes. However, no long-term increase or decline is apparent. (See Figure D-2, Appendix D.) And the remarkable reinvasion of pinks into the upper Fraser River system since 1945, when fishways were built at Hells Gate, has offset the extinction of many small local stocks.

Analyses of catch and escapement data indicate that stocks have been stable or increasing moderately in most areas. Fraser River (odd year) stocks show a strong rising trend, whereas the Queen Charlotte Islands (even year) and the Strait of Georgia (odd year) stocks show declines.

While the catch along the coast varies widely from year to year, the average is about 10.5 million fish. The optimum catch is generally above the current catch, and coastwide is believed to be about 15 million fish. (See Table D-3, Appendix D for details.)

Coho Commercial catches of coho have risen steadily since 1905. (See Figure D-3, Appendix D.) This cannot all be attributed to production from Canadian stocks, however, because in recent decades a portion of the catch has orginated from U.S. stocks and hatchery production.

For the 11 major production areas for which catch and escapement data have been analyzed, stock declines are indicated for 5 areas, stable or increasing stocks for 6. Despite some positive indications in some areas, natural production from B.C. rivers may well be declining, though this is disguised in some cases by increased production from hatcheries in the United States.

Commercial and sport catches of Canadian-produced coho currently average 2.5 million fish annually; optimum catches are estimated at 3.2 million (see Table D-4, Appendix D for details). Opportunities to increase the catches of coho are modest on a coastwide basis, the only significant opportunity being in the central coast area.

Chinook The commercial catch of chinook salmon has risen significantly since 1905. (See Figure D-3, Appendix D.) This cannot be attributed to healthy Canadian stocks, however, because a large proportion of the Canadian chinook catch has traditionally originated in rivers and hatcheries of the United States. Fish from the Columbia River, and especially those resulting from the enhancement projects on that river, have accounted for a significant portion of the Canadian catch in recent years. Our best estimates suggest that "American fish" account for 40 to 50 percent of the catch in the north and central coast areas, 20 to 45 percent in the Strait of Georgia and 70 to 90 percent off the west coast of Vancouver Island.

Analyses of catch and escapement data indicate that chinook stocks are depressed in most regions. In recent years the stocks in the Strait of Georgia and central coast have continued to decline, though they are believed to have stabilized in the Skeena and Nass areas and increased in Johnstone Strait and Rivers-Smith Inlets. The data available also indicate that stocks are increasing in the Fraser River and southwest Vancouver Island areas, but these results are suspect: we have grounds to believe that more intensive counting of escapements and larger catches of chinooks from enhancement projects in the United States and Canada are masking the recent decline of wild stocks in these areas. The information available on most stocks is very weak, and apprehensions about overfishing are aggravated by uncertainties about trends in catches and escapements.

On a coastwide basis, production from Canadian rivers appears to be well below potential. Production now averages some 880 thousand fish. (Note that the figure in Table 2-1 includes fish produced in the United States.) It is believed that this could be increased to 1.1 million. (See Table D-5, Appendix D for details.)

Chinook salmon are the least numerous of the five species; there are comparatively few stocks of them, and they are heavily fished in commercial, sport and Indian fisheries throughout most of their life cycle. As a result chinook stocks, particularly those of the Fraser River and the Strait of Georgia are the focus of a most urgent conservation concern. In later chapters of this report I refer to special measures to deal with the excessive pressure on chinook and coho stocks in the southern areas.

Steelhead Steelhead trout are often fished and managed along with salmon and so are included in this discussion.

Information about the condition of steelhead stocks has improved substantially in recent years as a result of a special inventory program. The findings are sobering: of the more than 400 streams that support steelhead, only 4 or 5 large systems are very productive; stocks are much lower than previously believed and numbers are declining. This is due to very heavy rates of exploitation: the summer and early fall runs are harvested especially heavily since they pass through the commercial fisheries at the same time as salmon; they are a popular species for sport fishermen; and they are also taken in the Indian fishery. In response to the decline, the angler catch has been curtailed by catch-and-release regulations, and measures have been taken to reduce the steelhead catch in the commercial and Indian fisheries. Such controls appear to offer promising prospects for restoring the depressed stocks.

Potential Yields

The analyses of potential yields from existing Canadian salmon stocks indicate that yields could be increased from the present level of about 22 million fish annually to some 37 million. The opportunities vary among species, as shown in Table 2-3. These estimates are adapted from the more detailed analyses set out in Appendix D, and it should be understood that the optimum catches are estimated within fairly wide margins.

The estimates in Table 2-3 of potential production, based on numbers of fish, are lower than the estimates in Table 2-1, based on the average weight of salmon. This is partly because the former relate to potential production from existing natural stocks only. But the difference also reflects the present uncertainty about current information on resource capabilities. Some observers believe that salmon stocks were once capable of yielding catches of 300 to 360 million pounds per year, so that potential yields could well be more than double the harvests of recent years. The suggestion that salmon production could be returned to historic levels apparently originated with the eminent fisheries biologist Dr. W.E. Ricker.[9] His estimate relied on a few special opportunities, notably rehabilitating Fraser River sockeye stocks to pre-1913 levels, restoring chum stocks coastwide and improving pink production on the south and central coasts. The analyses conducted for this report support Ricker's conclusions, as does a recent report on Fraser River sockeye stocks.[10]

Table 2-3 Potential harvests from existing salmon stocks

	present	optimum
	(average annual catches in millions of fish)	
sockeye	7.0	11.1
chum	1.5	3.2
pink	10.5	18.5
chinook	.9	1.1
coho	2.5	3.2
total	22.4	37.1

Pressures on the Stocks

A wide variety of factors affect the survival and productivity of our salmon stocks: in addition to recorded harvests in the commercial, sport and Indian fisheries, some additional fish are killed and unrecovered; natural predation accounts for more; habitat is altered by human and natural causes; oceanographic conditions affect food supplies, and so on.

Overfishing and habitat damage Where stocks have declined historically, the main causes are widely agreed to be overfishing and environmental damage. However, much controversy surrounds the relative impact of these two pressures. In my Preliminary Report, I tentatively concluded that the main cause of decline and low abundance of many stocks has been overfishing. That conclusion was based on analysis of the available evidence on historical catches and escapements and the productivity of spawning fish. The available data is limited mainly to the large river systems, so the runs in the hundreds of small streams that account for most coho production and altogether about half of all salmon production could not be analyzed. These smaller streams are undoubtedly the most vulnerable to habitat damage. I also noted in my Preliminary Report that even though overfishing has been the main cause of stock declines, habitat damage has undoubtedly reduced the potential productive capacity of the environment. Nonetheless, the conclusion that the main cause of decline in many stocks is overfishing has been bolstered by subsequent investigations. This should not be surprising since a number of earlier studies investigating the relationship between fishing pressure and stock trends came to a similar conclusion.

For example, a report of the International North Pacific Fisheries Commission pointed out that when fishing pressure was severely curtailed the affected fish stocks responded, showing "gratifying increases over the rather low levels of the early 1960s."[11] It also observed that when several populations are mixed in a fishery, the less productive stocks may be depleted before the overall level of maximum sustainable yield from the fishery is reached. We have reason to believe that this happened with numerous small stocks as the commercial fishery developed throughout this century.

The submission to this Commission by the American Fisheries Society also supports this general conclusion:

> Today as in the past it is a popular practice to blame pollution, bad logging practice, stream blockage, the Japanese fishery and all manner of other villains for our lack of fish. It is true that most of man's activities in and near watercourses have some deleterious effects on salmonid production as do natural disasters such as floods and droughts. However, our professional opinion based on extensive observations in salmon and steelhead streams in recent years is that the principal reason for declining abundance has often been overfishing. In spite of logging and other insults to some watercourses there currently exist many miles of excellent stream habitat practically unoccupied by juvenile salmon and steelhead as a result of insufficient spawning escapement.[12]

A recent study of Fraser River sockeye has come to a similar conclusion:

> . . . present levels of abundance are just over one half those of the 1894-1913 period and very considerable scope for further rehabilitation is indicated. . . . While the losses and gains are impossible to estimate numerically, it is judged that well over 90 percent of the original Fraser River capacity to produce sockeye remains intact today.[13]

Other evidence presented at this Commission's hearings regarding the devastating fishing practices of earlier years, the lack of correlation between declines in fish stocks and logging in their dependent watersheds, and the recent successes in rebuilding salmon stocks in Alaska by ensuring higher escapements, all support the conclusion that the depletion of salmon stocks can usually be traced to the same cause as the declines in other valuable fish in Canada; namely, overfishing. The implication of all this evidence is inescapable: to rebuild our natural stocks we must allow larger escapements.

However, the importance of increased escapements does not diminish the ultimate importance of habitat protection since the productive capacity of the habitat will limit the scope for increased fish production. While overfishing is now the main constraint on stock recovery, if the habitat is degraded, any rebuilding of the stocks will quickly press on its reduced carrying capacity. The following chapter, devoted to habitat management, draws attention to the devastating and lasting impact that slides, dams and diversions of watercourses have had on stocks in the past, and the widespread threat of logging, mining and pollution.

So the findings should be interpreted as follows. The capacity to produce fish is limited by the quality of the habitat, which in turn is determined by the vigilance of the habitat protection effort. But to take advantage of whatever capacity exists, enough fish must be allowed to spawn. The available evidence suggests that this is not being done. In short, those responsible for managing catches and escapements have not been as successful as those responsible for habitat protection.

Finally, it should be pointed out that these pressures on stocks are not independent; those who study population dynamics emphasize that one aggravates another. A population of fish already weakened by overfishing is more vulnerable to habitat degradation and *vice versa*.

Natural predators Concern was also expressed at the hearings about predation on the salmon stocks, in particular by seals and sea lions. Numerous reports indicate that populations of these species are increasing, and they are widely accused of taking large numbers of salmon and of having a significant impact on some stocks.

Eight species of marine mammals off the Pacific coast are known to be predators on salmon: the northern fur seal, the harbour seal, the northern sea lion and California sea lion, killer whale, Dall's porpoise and harbour porpoise, and the Pacific white-sided dolphin. Several of these species occur largely in offshore waters and little is known about their abundance or the quantities of salmon they consume. Others, such as northern sea lions, harbour seals, and killer whales occur throughout inshore waters and we have more information about these.

Estimates indicate that northern sea lions may consume about 2.6 million pounds of salmon per year, harbour seals some 1.3 million pounds,[14] and killer whales perhaps 5 million pounds.[15] The question as to whether fewer marine mammals would mean more salmon available for the fisheries is complex, however, since marine mammals also consume a number of other salmon predators. Moreover, the presence of some of these species, in particular the killer whale, which is thought to number only 300 in British Columbia waters, is regarded as desirable, and they are protected under federal statute.

Some have recommended a return to the kinds of predator control programs sponsored by fisheries departments in earlier decades; these involved annual hunts, bounties, and encouraging commercial utilization. I am not prepared to recommend that these be reinstated at present. Policy, in my opinion, should aim first at preserving a viable population of all species; and this is particularly important for marine mammals because of their scientific and aesthetic value. Beyond this, if their populations expand, if they impose heavy costs of predation and if they have commercial value, they should be managed as one of the interdependent components of the marine ecosystem.

Prospects

A number of conclusions can be drawn from our investigations of salmon stocks, the pressures on them, and their potential yields. First, in the aggregate our salmon stocks are well below their original levels of abundance. Second, while in the last two decades the overall decline has been arrested and for many stocks declines have been reversed (due mainly to improved fishery management), some stocks appear to be declining still. I am particularly apprehensive about the condition of many chinook and coho stocks. Third, the immediate cause of continuing declines and low levels of abundance is overfishing. And finally, salmon stocks can undoubtedly be rebuilt substantially through better management, more careful regulation of catches and enhancement.

HERRING

Herring have been exploited off the coast of British Columbia since 1877, but harvests were small until early in this century when a market for dry salted herring opened in the Orient. Annual catches rose to as high as 85 thousand short tons in the 1920s, then declined to 30 thousand tons in the Great Depression. Reduction of herring into meal and oil was not permitted, except as a byproduct of food, until the pilchard reduction fishery collapsed in the 1930s. Then a new herring reduction industry was established, and consequently catches increased sharply. In the 1950s herring landings averaged around 200 thousand short tons per year. Catches in the early 1960s were even larger, reaching the record of 264 thousand tons in the 1962-63 season and 260 thousand tons the following season. After 1965 the stocks collapsed dramatically, and the reduction fishery was closed indefinitely in 1968.

A minor fishery for local food and bait herring continued after the 1968 closure, but in the early 1970s, as the stocks began to recover and a market for herring roe opened up in Japan, heavy industrial exploitation of herring resumed.

The roe-herring fishery has since been a major but unstable industry, with landings in excess of 80 thousand short tons in 1976 and 1977. Catches have been much lower since then; landings amounted to 34 thousand short tons in 1981, and some 28 thousand tons in 1982. Lesser fisheries for food and bait herring continue, with landings of food fish around 10 thousand tons in recent years and landings of bait around 1 to 2 thousand tons.

Trends in Stocks

Data on herring have been gathered since the 1930s, and it has been possible to observe the response of the stocks to a wide range of exploitation rates. As a result, the west coast herring fishery is well documented for purposes of biological assessment.

Analysis of the historical evidence indicates that the peak catches of the early 1960s followed recruitment of several unusually strong year-classes; then in subsequent years exceptionally weak recruitment coincided with very heavy fishing pressure until the stocks collapsed. Stronger year-classes began to appear by 1971 and within four years most stocks recovered to the level of the 1950s. Subsequently, except for a strong recruitment in 1977-78, recruitment has apparently been weak, especially in northern areas.

The rise and subsequent sharp decline in production follows a classical pattern observed in many exploited fisheries. But the recent recovery in these stocks is remarkable.

Potential Yields

Estimates indicate that by 1975 the herring stocks in the Strait of Georgia had recovered to nearly the optimum level for long-term yields, and the spawning stocks on the west coast of Vancouver Island and the Queen Charlotte Islands may even exceed this level. Recent recruitment to the stocks off the west coast of Vancouver Island has been weak, apparently the result of normal fluctuations. Experience suggests that refraining from heavy fishing on these weaker year-classes will be necessary if the kind of collapse that occurred in the reduction fishery is to be avoided. On the north coast, stocks are well below the optimum size, and there are some indications that ecological changes may have reduced productivity in that region in recent years.

Biologists now believe that the optimum rate of herring exploitation is in the range of 30 to 50 percent of the stock per year, and suggest that the stocks should be managed and exploited conservatively with harvests not exceeding 30 percent. On this basis, the average annual catch of herring could be as high as 160 thousand metric tons for the whole coast, though with significant year-to-year variations. However, in order to achieve this potential, resource data and regulation of the fishery will have to improve substantially, as I explain in Chapter 4.

HALIBUT

The halibut fishery is among the oldest on the Pacific coast; and, until it was recently overtaken by the roe-herring fishery, it was second in importance to salmon. The fishery began in the last century off the coast of the State of Washington, and significant Canadian participation began during the first World War.

Native Indians and early commercial fishermen enjoyed a rich harvest from extensive stocks that contained a high proportion of large, mature fish. The landings of Canadian and U.S. fishermen peaked in the 1920s at some 70 million pounds, then declined to about 30 million in the early 1930s.

Recognizing the need for joint action to preserve and develop the fishery, Canada and the United States created an international commission for this purpose in 1923. The commission's conservation program was successful in rehabilitating the stocks so that landings rose to 75 million pounds in 1962. Since then, the stocks have again declined, and the landings of the two countries combined have ranged between 20 and 30 million pounds.

The International Pacific Halibut Commission has accumulated a great deal of scientific information on this species and unusually complete statistical data on the fishery. We now know that by the 1960s U.S. and Canadian trawl fleets, fishing for lower-valued bottom fish such as pollock, hake, sole and rockfish, caused high mortality in immature halibut caught incidentally and returned to the sea. Even more serious was the trawling of distant-water fleets from the Soviet Union and Japan directed mainly to other groundfish. Heavy by-catches of halibut were almost certainly the main cause of the sharp decline in halibut stocks. Other contributing factors were incidental catches in the Alaskan king crab fishery and, possibly, changes in the oceanic environment.

Halibut are a long-lived species and take many years to mature; so rebuilding the stocks to the level of the early 1960s may well take more than a decade. Thus the Canadian catch may need to be held below 6 million pounds for some time, and improved control of by-catches in other fisheries will be necessary as well.

OTHER GROUNDFISH

Groundfish, other than halibut, have never figured as importantly in the fisheries of Canada's Pacific coast as they have in many other areas. Nevertheless, catches have been increasing steadily, and at 60 to 70 million pounds are now triple the landings of two decades ago. A wide variety of species are taken in this fishery, but catches are dominated by Pacific cod, ocean perch, hake and sablefish.

Catch records and other data have been collected for several decades, but interest in groundfish stocks remained low until Canadian fisheries jurisdiction was extended to 200 miles in 1977. Stocks that were previously ignored are now the subject of biological studies.

Although the available data are in many cases weak, analyses indicate that most groundfish stocks are in good condition with populations capable of yielding close to maximum sustainable catches. There are exceptions to this generalization for some species in certain areas, such as the depressed stocks of ling cod in the Strait of Georgia. But the only species that appears to be seriously overexploited over wide areas is Pacific ocean perch.

In short, these stock assessments reveal few species for which yields are likely to decline and several that offer opportunities for increased catches, notably pollock, hake and dogfish. But the data are not yet adequate to estimate sustainable yields with much precision, and the potential of all groundfish species may be anywhere from the present landings of 30 thousand metric tons per year to 3 times this amount.

INVERTEBRATE SPECIES

The Pacific coast also supports a considerable variety of minor fisheries, based primarily on shellfish and crustacea. Production in these small fisheries has grown substantially in recent years, with landings of 20 million pounds in 1980 nearly double those of a decade earlier.

The most important species in order of quantity landed are now geoduck, oysters, crabs, clams, shrimp, prawns and abalone.

Geoducks The first commercial geoduck harvest, which totalled 96 thousand pounds, was recorded as recently as 1976. With lucrative new markets in Japan, landings have since increased substantially to 5.7 million pounds in 1981. Information on geoduck stocks is sparse, and the department has fixed a limit to the annual harvest of 6 million pounds, 4 million to be taken from the south coast and 2 million from the north. The appropriateness of these harvest limits is uncertain, and some evidence indicates that geoduck stocks are being overexploited in the south.

Oysters The Province of British Columbia, through the Marine Resources Branch of the Ministry of Environment, is responsible for regulating the oyster fishery. Commercial harvests have averaged nearly 5.7 million pounds in recent years. Most of the harvest is taken from cultured stocks, with wild stocks contributing probably less than 15 percent of the total.

The scope for expanded production of cultured oysters is thought to be substantial though critically dependent on markets and production costs, so the Marine Resources Branch has been encouraging oyster culture rather than commercial production from wild stocks. This policy, coupled with increasing recreational harvesting of the more accessible wild stocks, makes it likely that commercial harvests of wild stocks will decline.

Crabs Abundant stocks of crab in coastal waters support both recreational and commercial fisheries. The total catch has fluctuated considerably as have crab populations, which show volatile recruitment and mortality. Regulations permit retention of crabs larger than 6½ inches (across the back of the shell) only. As long as the regulations are adhered to, this is an effective means of protecting brood stocks because females do not grow that large and males reach breeding age before attaining that size. Harvests are now about 2.7 million pounds annually, and the potential yields from crab stocks are likely to be between 2 and 3 million pounds, fluctuating from year to year in response to variations in stock size.

Clams Commercial harvests draw heavily on butter clams, manila clams and littleneck clams. Commercial landings have been recorded since the beginning of the century, but production in recent decades has been erratic as a result of market fluctuations and the recurrence of paralytic shellfish poison (red tide). Apparently, only manila clams are being harvested at or above the estimated sustainable yields. While the stocks appear capable of supporting increased levels of exploitation, the threat of paralytic shellfish poison is a serious impediment to expansion.

Shrimp and prawns Nine species of shrimp and prawns are found on Canada's Pacific coast, six of which are exploited commercially. Shrimp catches have been fairly steady in recent years except for a large but short-lived fishery off Vancouver Island during the 1970s. Prawn fishing has expanded sharply during the last three years, the consequences of which are not yet apparent, although the prawn grounds in certain areas, such as Howe Sound, are believed to have been overfished. Recent annual harvests of about 1.8 million pounds are believed to be close to the maximum sustainable yields.

Abalone Abalone provide a traditional food for coastal Indians, and have a long history of commercial and recreational use. Like geoducks, abalone have recently been in strong demand in Japanese markets. After 1976, landings burgeoned, with a peak harvest of

954 thousand pounds in 1978. The total allowable harvest has since been progressively reduced to 200 thousand pounds in 1981, which is probably close to a sustainable yield.

Little is known about the recruitment and growth rates of abalone, or about the current abundance of stocks. But experience in the United States suggests that abalone are highly vulnerable to overfishing and that stocks recover very slowly once they have been overfished. Opportunities may exist for culturing abalone to supplement wild production.

CONCLUDING OBSERVATIONS

The condition of our fish stocks is better than many commentators have suggested. Herring stocks, for the most part, appear to be healthy. And, with the exception of halibut and a few other stocks, groundfish are in good condition as well. With improved biological information, we should be able to manage these fisheries so that exploitation will not endanger the viability of the stocks.

Halibut stocks are seriously depressed, but the causes have been recognized and steps have been taken to control them. Moreover, the record of the International Pacific Halibut Commission suggests that the management of these stocks is in capable hands. I am also satisfied that, with a few exceptions, stocks of the many minor but often very valuable invertebrate species are in good condition. But demands on them are increasing, and this will require more management attention.

My investigation of the condition of our salmon resource leaves me much less sanguine, however. Concern is clearly warranted for those stocks in decline; and in the case of certain chinook and coho stocks, the situation appears to be urgent. Equally worrisome is the weakness of the data used to monitor catch and escapement. Without substantial improvements in these areas, reversing the declines in some stocks and realizing the substantial potential from stock rehabilitation will be impossible.

In many respects the most encouraging and challenging finding from the review of the resources and the fisheries is the potential for significantly increasing the yields from the major fisheries. Salmon landings could be roughly doubled, and herring and halibut landings could be more than doubled. The potential rewards from expanded production are great, and well worth the needed effort. In later chapters I propose specific measures to provide the necessary improvements in fishery management and to restructure the fisheries so that these potential benefits can be realized.

FOOTNOTES

1. North-Pacific International Chapter of the American Fisheries Society, Exhibit #148, p. 4.
2. The data for the commercial catch are based on Blake Campbell, "Summary of Salmon Landings in British Columbia by Species and Gear." Memorandum prepared for this Commission, 1981; the sport catches of chinook, coho and pink are extrapolated from DPA Consulting Limited, "1980-81 Georgia Strait Sport Fishing Creel Survey Summary." Prepared for the Department of Fisheries and Oceans, April 1982; the catch of the Indian food fishery is based on Department of Fisheries and Oceans, Exhibit #167, Table 1.
3. For the years preceding 1920, data were obtained from Sixty-First Annual Report of the Fisheries Branch. Department of Marine and Fisheries, Ottawa, 1928. pp. 86-87. (Production is reported in packed cases; the following pieces per case are used for conversion: sockeye, chum and coho - 13 pieces per case; chinook - 7 pieces per case; pink - 20 pieces per case); for the period 1920 to 1976, from Historical Catch Statistics for Salmon of the North Pacific Ocean. International North Pacific Fisheries Commission, Bulletin No. 39, Vancouver, 1979. Table 63; for 1977 to 1980 from Annual Summary of British Columbia Catch Statistics 1980. Department of Fisheries and Oceans, Vancouver, 1981.
4. Additional Information on the Exploitation, Scientific Investigation, and Management of Salmon Stocks on the Pacific Coasts of Canada and the United States in Relation to the Abstention Provisions of the North Pacific Fisheries Convention. International North Pacific Fisheries Commission, Bulletin No. 29, Vancouver, 1974; E.H. Vernon, Fraser River Sockeye: The Stocks and Their Enhancement. Department of Fisheries and Oceans, Vancouver, January 1982.
5. W.E. Ricker, Changes in the Average Size and Average Age of Pacific Salmon, Canadian Journal of Fisheries and Aquatic Science, (in press).
6. Milne, D.J. (Prepared by H. Godfrey), Sizes and Age of Chinook (Oncorhynchus tshawytscha) and Coho (O. Kisutch) Salmon in the British Columbia Troll Fisheries (1952-1959) and the Fraser River Gillnet Fishery (1956-1959). Fisheries Research Board of Canada, MRS (Biological), No. 776, Ottawa, 1964.
7. Vernon, Fraser River Sockeye.
8. International North Pacific Fisheries Commission, Bulletin No. 29.
9. W.E. Ricker, Productive Capacity of Canadian Fisheries. Fisheries Research Board of Canada, Nanaimo Biological Station, Circular No. 64, Nanaimo, 1962.
10. Vernon, Fraser River Sockeye.
11. International North Pacific Fisheries Commission, Bulletin No. 29. p. 28.
12. North-Pacific International Chapter of the American Fisheries Society, Exhibit #148, p. 2.
13. Vernon, Fraser River Sockeye, p. 18.
14. D.J. Spalding, Comparative Feeding Habits of the Fur Seal, Sea Lion, and Harbour Seal on the British Columbia Coast. Fisheries Research Board of Canada, Bulletin No. 146, Ottawa, 1964.
15. Personal Communication, M. Bigg, Pacific Biological Station.

CHAPTER 3

HABITAT MANAGEMENT

> *When fish habitat is lost or threatened, the fish stocks and species which depend upon it for food, protection and reproduction are similarly lost or threatened. In short, if habitat goes, so eventually do the fish . . . .*
>
> BRITISH COLUMBIA WILDLIFE FEDERATION[1]

Concern for the protection of fish habitat is widespread. Apprehensions about habitat deterioration and about our policies for controlling it are expressed not only by fishermen but also by many others who have a general concern for the natural environment and who often look to fish as a barometer of environmental integrity.

The discussion of fish resources in Chapter 2 dealt with the condition of the stocks. In a more fundamental sense, the resource base is the natural environment that supports fish. Unless the quality and productivity of the aquatic habitat is maintained, even the best of stock management will be to no avail. Whenever the environment that fish depend on for food or reproduction is damaged, the fish are threatened. Thus, the protection of aquatic habitat is considered by many to be the "first and foremost" problem of fisheries policy.[2]

The most valuable stocks on the Pacific coast — salmon — are unusually sensitive to habitat disturbances because of their dependence on freshwater environments for critical stages of their life cycles. Man's activities in watersheds, even hundreds of miles from the ocean, can upset the habitat and hence also the populations of fish. On the Pacific coast this presents especially difficult resource management problems. The mountain watersheds that support these valuable stocks also contain exceptionally valuable timber, rich mineral deposits, hydroelectric opportunities, the best agricultural land, as well as the natural transportation corridors and urban development centres. Estuaries are the common coastal centres of population and commerce. As a result, most resource development and industrial activity impinge on the habitat of fish.

All this leads to a conclusion that should be made clear at the outset of this chapter: environmental protection is more crucial on the Pacific coast than elsewhere. Standards of pollution control and habitat protection appropriate for Ontario or Saskatchewan may not be sufficient to protect the fisheries of the Pacific coast.

PRESSURES ON FISH HABITAT

The habitat of many of our stocks has already suffered damage. The impacts of human population growth, continuing resource development and industrial expansion, new technology, and generally increasing demands on land and water have taken their toll, and in the opinion of some observers, the habitat of some of our stocks is in a state of crisis.

Quantifying the impact on fish stocks of past damage to their habitat is virtually impossible. First, our historical statistics are inadequate. Second, damage from logging and other activities may not be permanent: streams have the power, over time, to rehabilitate and cleanse themselves from some kinds of damage, although the period of time for such recovery may be measured in many decades. Third, the specific adverse impact on stocks of overfishing and habitat damage are not always independent: one can aggravate the effect of the other. And finally, losses of habitat are often difficult to identify: they are frequently the result of a host of sublethal changes and individually minor pressures on the environment which, collectively, can reduce or destroy its ability to support fish. Thus, in attempting to identify the probable impact of a development, we have no point of reference in terms of information on the predevelopment, pristine condition since all stocks have been subjected to fishing pressures and perturbations for decades.

For these and other reasons, identifying the potential impact of a proposed development is also difficult. In attempting to do so, we may underestimate the long-term adverse effects. Combined with a multiplicity of adverse effects from various other environmental insults, as well as the pressures of commercial, sport and Indian fisheries, the effects of a single project cannot easily be isolated and identified even by after-the-fact observation of stock strength.

In particular watersheds or sites, the major adverse effect on fish may be from any one of a variety of sources of environmental damage. But in the Pacific region generally, the greatest potential threats to the habitats of salmon and related species are dams and diversions, forestry, mining and foreshore developments.

Dams, Slides and Diversions

Obstructions in streams present the most direct barriers to mature fish on their spawning migrations and to young fish making their way to sea. Environmental changes that impose stresses, particularly changes in water temperatures and flow regime, can seriously reduce productivity. Landslides, dams and diversions for hydroelectric and other purposes have taken a heavy toll on Pacific salmon and other anadromous stocks. Some of the most conspicuous and devastating effects have resulted from landslides into spawning rivers. The man-induced Hells Gate slides of 1913 and 1914 decimated the Fraser River runs of sockeye salmon as well as other stocks that depended on spawning beds above the slide, especially the large runs of pink salmon. And the Babine slide of 1951, a natural event, drastically reduced the Babine sockeye runs.

Dams were constructed early in this century in ignorance of, or with disregard to, their effects on fish, with devastating results. A dam on the Adams River, built for logging purposes, and one on the Quesnel for placer mining contributed to the decline in the Fraser River stocks. Other, more permanent dams were built on the Puntledge, Stave, Capilano, Bridge, Seton, Cheakamus, Jones, Kloiyah, Nechako and Campbell rivers, and on Great Central Lake.

In the States of Washington and Oregon to the south, dams and diversions have been the major environmental insult to fish. In British Columbia, large hydroelectric dams and flood control works on major spawning rivers have been more vigorously opposed. And while the damage from this cause has been substantial — the dams on rivers such as the Puntledge had almost destroyed unique runs before the hatcheries were constructed — hydroelectric dams have caused less permanent loss of fish on Canada's Pacific coast than have other causes of environmental damage. Yet, dams and diversions probably pose the greatest potential threat to natural salmon stocks. Whether technology will ever be developed to enable large runs of fish to pass over high dams, such as those that have been contemplated for the Fraser system, is questionable. In any case, improved fish passage technology would not prevent the destruction of salmonid habitat. Future losses will therefore hinge on political decisions on flood control and hydroelectric development.

Smaller-scale diversions of water for irrigation and domestic and industrial water supplies have been very damaging to fish, especially in urban areas and in the agricultural regions of the lower Fraser valley, on the east coast of Vancouver Island and in the dry ranching and fruit-growing country of the interior. The heaviest demands for irrigation tend to be in the summer when stream-dwelling salmonids may be already stressed by low flows. Further, unless intakes are carefully screened, fish pass with irrigation water into the fields and orchards.

Forestry

The forest canopy that covers the watersheds of western Canada protects and sustains the water systems that provide fish habitat. Removal of this cover inevitably disturbs the aquatic environment. The adverse impact of forest development and harvesting operations on fish habitat has received a great deal of attention in this Commission's public hearings. Logging and related activities are now widely agreed to have had a greater overall impact on salmon stocks than any other single source of habitat damage:

> Surely the central issue which your commission must address is the question of how British Columbia's two great renewable resource industries can co-exist without one destroying the other.[3]

Logging in the early decades of this century was extremely destructive to anadromous fish. No controls were in place to protect streams from road and railroad construction, log jams and debris, log driving, siltation, denudation of streambank vegetation and the many subtle effects of cutting, yarding and transporting timber. Massive loads of sediment left spawning gravel unproductive, and log jams and debris obstructed fish access to spawning and rearing waters. The causes of some of these early losses, such as log driving and dams built for log transport, have since been eliminated. Many coastal streams have in large part recovered through years of natural rehabilitation and forest regrowth.

The heavy timber on the mountainous west coast cannot be logged without causing some, at least temporary, disturbance to the aquatic environment, even with the best practices. The forest industry has expanded to a vast scale in British Columbia, clearcutting 300 to 400 thousand acres annually. And much of this logging has progressed beyond valley bottoms into the high elevations, steep slopes and unstable soils of the headwaters, posing new threats of slides and stream destabilization.

Forest operations are so pervasive in British Columbia and leave such an abrasive visual impact on the landscape, that they are widely held to be a major cause of declines in salmon stocks. Certainly, logging practices in the past had little regard for fish habitat and, as I have noted, were destructive to fish. Even now, examples of careless and unnecessarily damaging logging and road-building practices recur. But the scientific evidence available from careful studies of the impact of logging on fish habitat, like the Carnation Creek project on Vancouver Island and others in the United States, contradict some superficial impressions. For example, these studies show that clearcutting does not necessarily result in reduced runoff; that stable large debris in streams is normal and creates the pools needed for overwintering fry; and that the higher stream temperatures after forest clearing does not always impair fish productivity. But such studies also reveal the possibility of destabilizing streams through poorly planned streambank activities, and the critical importance of small tributaries and estuaries for fish production.[4]

That there have not been more studies of this kind in British Columbia is disturbing, particularly since it is risky to extrapolate appropriate management prescriptions from one watershed to another.

Logging operations today are undoubtedly less damaging than they were in the past, and we now know a great deal more about how to reduce their detrimental effects on fish habitat: they can be dispersed to avoid total removal of forest cover over entire watersheds; unstable slopes can be avoided; streambank vegetation can be preserved and the streambeds left undisturbed; denuded areas can be quickly reforested; and logging and roadbuilding methods can be modified in a host of ways. But the successful application of these techniques requires advance planning and detailed information about the forest, soils, waterflows and fish. The present deficiencies in resource information, especially respecting fish, and in the regulatory provisions for integrating fish habitat requirements into forest development plans, are major obstacles to the protection of fish stocks.

Foreshore and Estuary Developments

Estuaries are among the most critical areas for fish. In their rich, shallow and slow-moving waters, migrating salmon congregate before their final dash to their spawning grounds, and in the estuarine marshes the young fish pause to feed and make the transition from fresh to ocean water. The ecology of these areas is extremely complex and delicate, not only for migratory fish, but for herring, smelt, sturgeon, shellfish and crabs, which are present in, and dependent on, the quality of the estuary and foreshore environments.

These estuaries and foreshore areas are also the main centres of settlement, port and shipping facilities, marinas and industrial developments; and they are the scene of active dyking, filling, dredging, log storage and other operations. The concentration of human activity in these areas is so highly critical for fish that much of the concern about fish habitat has focused on them, and rightly so.

The Fraser River has the most important estuary on the Pacific coast, with the fish stocks that depend on it being unmatched in size and diversity. At the same time, more than half the population of British Columbia lives in the lower Fraser valley, and it contains a high proportion of the province's industrial activity. The problem of protecting fish environment in these circumstances is enormous.

Pollution

Freshwater and marine fish habitat can be detrimentally affected or destroyed not only by physically disturbing waterways but also by degrading water quality. Chemical pollution associated with pesticides, herbicides, acids, petroleum products, heavy metals, chemical spills and other waste products can all leave water toxic to fish or to the various aquatic organisms important to fish productivity. The sublethal effects of pollutants are not always obvious but can reduce the water's ability to support fish.

Industrial wastes such as fibre from pulpmills, sawdust from sawmills and bark from forest operations sometimes coat spawning beds. Silt from gravel operations, roadbuilding and other works plugs the spaces in the spawning gravel so that eggs and fry cannot survive. Organic wastes, discharged in large quantities from sewage works, pulpmills, breweries, meat-packing plants and canneries, decompose and, in the process, rob the water of its oxygen, so that it is intolerable to fish. Waste heat added with effluents to water systems has physical and biological effects that also reduce dissolved oxygen.

Some of the most toxic pollutants are discharged by mines and mine-milling operations. In British Columbia and Yukon these industries have multiplied dramatically during the last two decades, and the scale of operations has grown as well. Consequently, mining has presented an increasing threat to fish habitat. During the last few years, projects and proposals for mineral development have become the focus of controversy, mainly because of their uncertain potential effects on fish. A main concern is the disposal of enormous quantities of tailings (finely ground rock) and the control of chemical effluents.

The detrimental effect of pollution, particularly from domestic sewage, has been most obvious on shellfish stocks in inshore coastal waters. Many shellfish areas, including Boundary Bay, Burrard Inlet, the Fraser River, and Nanaimo and Ladysmith harbours, have been closed because of dangerous levels of coliform.

In the estuary of the Fraser River, the pollution problem is becoming acute. Close to 200 discharges into the estuary are permitted (below the Port Mann bridge) along with at least an equal number of storm-water outfalls. A recent official study of the estuary, which documented the trends in water quality since the 1960s, found that a startling 80 percent of permitted discharges regularly exceeded the authorized limits of effluent quality or quantity.[5] Most remarkable perhaps is that the water quality is still as high as it is, a result undoubtedly of the power of this great river to cleanse itself.

Urbanization

Ever-expanding urban and commercial development has destroyed or degraded much of the stream habitat in and around cities, particularly in the major centres of the lower mainland and southern Vancouver Island. Destruction of fish habitat in these areas takes place bit by bit, with culverting of creeks under roads and streets, dyking, streambed channeling, removal of streamside cover and installation of drainage systems. Seepage of a host of toxic substances from waste disposal landfills and other sources is a serious problem in many areas. Streams that once supported salmon have simply disappeared in the wake of housing and industrial development, particularly in greater Vancouver, Victoria, and the lower Fraser region. Others are seriously degraded; notable examples brought to the attention of this Commission include the Coquitlam River, Brunette River and McNally Creek. Only recently have municipal authorities begun to think systematically about the preservation of natural streams within their boundaries.

Oil Spills

An environmental threat that has attracted worldwide concern during the last decade is that of oil spills, especially those that result from accidents involving large tankers and drilling rigs. The deficiencies of modern technology in coping with large spills and the damage they can do to sea life have been demonstrated time and again.

Some petroleum products are lethal to adult fish even at low concentrations,[6] but by far the most acute effects are on fish in the egg and larval stages and on other marine organisms that they depend on for food. The impact is most severe in estuaries and inshore waters because of their importance as spawning, rearing and feeding areas for fish.

Of the major commercial species along the coast of British Columbia, herring is probably the most vulnerable to oil spills. These fish spawn on algae and other intertidal vegetation, or on rocks when no vegetation is available. After they hatch, the larvae drift with the currents near the surface. Oil drifting inshore can kill both eggs and larvae. Shrimps, prawns, crabs and a variety of shellfish and bottom fish are similarly susceptible in their larval stages. Some of these do not now support significant fisheries but are abundant and important in the food chains of commercial species. Even some of the more resistant species would be weakened or tainted by oil and thereby rendered unusable.

All species, but particularly bottom fish, are vulnerable to chemical dispersants, emulsifiers and sinking agents used to clean up oil spills. Sometimes they are toxic in themselves, but even when they are not, sinking hydrocarbons can poison fish either directly or through the food chain.

We are fortunate that few major oil spills have occurred off the coast of British Columbia and, on the whole, permanent damage to fish from this source has not been great. But expanding domestic and U.S. tanker traffic, oil port developments, and especially the possibility of oil drilling activity, pose increasing hazards to fish against which available technology offers only limited protection.

Other Impacts

The threats to fish habitat mentioned above are only some of the most conspicuous; others include road, railroad, pipeline and transmission line construction. The incremental impact of habitat contamination from non-point sources, such as agriculture, is another concern. The contaminants are often sublethal and difficult to detect or quantify. During the past few years, the high price of gold has resulted in greatly increased placer mining activity with attendant damage to fish habitat from hydraulicking, suction dredging and stream diversions.

Important also are natural variations in the environment. Fishermen as well as biologists know that unpredictable shifts in ocean currents can profoundly alter the migration patterns of stocks; droughts and low streamflows during the summer can affect rearing fish and leave spawning grounds inaccessible; extreme cold or heavy rains (such as occurred in 1980) can devastate eggs overwintering in stream gravel, and so on. The impact of such events is usually most serious when the stocks are already weakened by other damage to their habitat or, especially, by overfishing.

POLICY FOR HABITAT MANAGEMENT

Thus, the environment that supports our Pacific fisheries is being assaulted from many directions. To protect it so that our fish resources can be maintained, we will need a strong and comprehensive habitat management policy. If left unchallenged, these activities would undoubtedly lead to serious, and in many cases, irreparable harm to Pacific fisheries.

Like the soil that nurtures agricultural crops, fish habitat can be viewed as a natural resource in its own right. When harmful waste and other materials are deposited into water, when migrating fish are denied passage through streams, or when aquatic and marine environments are impaired by other human activities, nature's ability to produce fish is hampered. Seen in this light, concerns about habitat quality go hand in hand with fisheries management and enhancement, the subjects of the following chapters. Depleted wild stocks can be restored by more effective fisheries management and certain enhancement techniques, but only if the natural environment is capable of supporting larger populations. Ultimately, the health of habitat will govern the natural productivity of the fisheries.

The federal Parliament's role in habitat protection stems from its constitutional jurisdiction over sea coast and inland fisheries. Courts have held that this authority extends beyond simply regulating fishing activities, to enacting legislation intended to protect fish habitat.[7] Under this authority, provisions of the Fisheries Act prohibit the "harmful alteration, disruption or destruction of fish habitat" (section 31) and the "deposit of a deleterious substance . . . in water frequented by fish" (section 33(2)). Other sections require fish facilities to be constructed to pass fish over dams and other obstructions (section 20) and screens to be installed on water diversion intakes (section 28). However, in British Columbia, the province owns most of the uplands and the freshwater that serve as fish habitat; and it controls most of the timber and mineral resources (as landowner), which it allocates to private interests through a variety of agreements. It also has legislative authority over municipal affairs and most other upland activities that threaten fish habitat.

This division of ownership and jurisdiction between the two levels of government lies at the root of much of the difficulty associated with habitat protection in the province. The federal government may regulate activities that impinge on fish habitat even though it does not own the land and water resources. Thus, forest, mining and other operators on provincial Crown land are typically required to serve two masters: they must comply with the terms of their resource agreements with the provincial government, while ensuring that their activities do not contravene the Fisheries Act. As well, the gains from resource developments are often seen to accrue to the provincial Crown and to private interests, while the cost inflicted by them on fish habitat is borne largely by the federal government and those who depend on fish.

Activities on privately owned land, such as private timber operations, land developments and so on, do not involve provincial agencies to nearly the same extent. But the habitat protection provisions of the Fisheries Act apply to them as well, pitting private interests directly against the health of fish habitat.

The task of reconciling conflicts over the use of public and private land with the needs of fisheries resources is the fundamental issue to be addressed in formulating policy for habitat management. Under current policy, the Department of Fisheries and Oceans participates in referral and other programs with provincial government agencies, so that the Department has the opportunity to review proposed developments in watersheds. The success of these arrangements ultimately hinges on the Department's knowledge of the habitat it is attempting to protect, the objectives it tries to serve and the legal and other mechanisms that are available to it in fulfilling its mandate. Each of these is discussed below.

Habitat Information

Despite the pivotal importance of the habitat for fisheries management and development, the Department knows surprisingly little about the present quality of fish habitats in the Pacific region or their ability to support fish. These vary widely among water systems, depending on their size, gravel conditions, hydrological characteristics, streambank cover, nutrient levels in streams and lakes, and tidal patterns and vegetation in estuaries, among other things. These dimensions determine the capability of land and water to support fish, but to date the Department has made no comprehensive inventory of habitat in the region.

This lack of basic information stands in the way of effective planning. Moreover, the Department needs much improved information about fish habitat for its dealings with other resource industries. Without it, fisheries managers cannot properly assess the impact of proposed operations and proponents cannot design appropriate means of avoiding or minimizing damage.

British Columbia's Ministry of Environment has already initiated a computerized aquatic inventory program, and I understand that the Department of Fisheries and Oceans has been exploring alternative methods of collecting, collating and disseminating such information (a subject I return to in Chapter 6). My recommendations are intended to recognize the need for both governments to obtain improved habitat information and to minimize duplication of effort.

1. **The government of Canada should invite the government of British Columbia to participate in a joint program aimed at compiling a comprehensive inventory of fish habitats in freshwater streams and estuaries in British Columbia. The inventory should describe the biophysical characteristics of individual areas of fish habitat, and should include an assessment of their potential for producing fish.**

The program should be a substantial one, combining, expanding and coordinating the present efforts of the two governments to produce a systematic inventory of at least the most important aquatic systems in the province. And while it will complement the intergovernmental Salmonid Enhancement Program discussed in Chapter 5, it should be organized separately, and the respective contributions of the two governments could differ. In Chapter 18 I propose that both be incorporated into a general federal-provincial agreement on fisheries matters. The cost of the inventory should be shared between the two governments in proportions that should be negotiated. The total cost will depend upon the detail of the information sought.

The inventory should be designed to provide hydrological data required by the federal and provincial authorities as well as the basic information needed for estimating the capabilities of water systems to support fish populations, especially salmon. Beyond that, it should identify opportunities to enhance the productivity of habitats through stream improvements and other measures. Consideration should be given to classifying or zoning watersheds according to their potential for producing fish to assist in coherent watershed and regional planning.

Habitat Management Objectives

The Department's stated objective in habitat management is "to conserve and develop habitat of federally managed aquatic species in a manner that will serve fisheries resource management goals."[8] While I cannot criticize this general principle, the Department should be guided by more specific objectives. This should be done for two reasons. First, as I explain in the next chapter, the Department needs explicit fish-production targets to provide long-term management objectives, and these targets must rest on assumptions about the productive capacity of the habitat in the future. There I propose that these targets be based upon full utilization of the existing natural habitat and additional production resulting from enhancement. Second, explicit objectives will strengthen the Department's hand in dealing with other resource industries that threaten habitat by providing a baseline against which proposed operations in a watershed can be assessed. Without being able to point to targets of its own in support of its positions, the Department is left to react defensively, and often negatively, to proposals.

The federal government's approach to habitat protection must be consistent with its responsibilities for fisheries resources generally. Along with its constitutional authority over fisheries, it has a corresponding duty to ensure that fisheries resources are conserved and used wisely for the benefit of Canadians as a whole. This point deserves emphasis because too often the line dividing federal and provincial responsibilities in this area becomes blurred, leaving the impression that the public being served by both governments is the same. This is not the case: in managing Pacific fisheries the federal government is responsible to Canadians, not only in British Columbia, but also in other parts of Canada. The need to recognize this broader federal responsibility and accountability will be even more pressing as the fisheries are rationalized and public revenues emerge under my proposals in Part III of this report.

Those with interests in fish resources sometimes suggest that no habitat should ever be sacrificed for other purposes. Such a rigid policy is unrealistic in view of the broad and interrelated patterns of economic and social development on the Pacific coast. It cannot be assumed that Canadians as a whole would be better off were all fish habitat frozen in their current state, if indeed that could be done. In some cases, fish habitat can be improved or expanded, yielding fisheries benefits exceeding the sacrifices in other resource values; in other cases, another form of development will yield benefits greater than the value of habitat lost. Fish habitat, like all other resources, must be used flexibly in light of changing circumstances if Canadians are to realize maximum benefits over time.

So, in exercising its authority over fisheries, the federal government should ensure that habitat is not sacrificed to other competing values, such as forestry, mining, hydroelectric power, and land development in any instance unless it is assured that benefits will accrue to Canadians that will at least offset the loss in fish production capacity. My following recommendations provide an operational framework for implementing this general policy.

The specific role of the Department of Fisheries and Oceans should be to ensure that the productive capacity of natural fish habitat is protected against damage from industrial activities and, if damage is unavoidable in particular instances, that full compensation will be provided through enhanced productive capacity elsewhere. Thus—

2. **The policy of the Department should be to ensure that the total fish production capacity in the region will not be diminished as a result of industrial and other activities that impinge upon fish habitat. Identifiable and measurable harm to fish habitat should be tolerated for any particular development only if the damage is fully compensated through expanded fish-production capacity elsewhere.**

This proposal implies the need for firm legislation to protect fish habitat from activities that threaten it and to enable the Department to function from a position of strength. I return to legislative provisions later in this chapter.

Compensation Policy

To ensure that the capacity to produce fish is maintained in the face of new industrial projects and other developments that threaten it, the Department needs clear operational guidance. My proposals are aimed at ensuring that all feasible measures will be taken to avoid or minimize damage to fish habitat; only if these cannot fully preserve its productive capacity should compensation be considered.

3. **The Department should adopt an explicit policy for assessing proposed developments that threaten fish habitat and for determining compensation where required, based on the following precepts:**

    i) **In considering proposals for new developments, the Department should investigate their impact on fish habitat and all feasible means of avoiding or minimizing harm to fish.**

    ii) **Developers should be required to adopt all reasonable measures to avoid or mitigate damage to fish habitat.**

    iii) **If such measures are insufficient to prevent habitat damage, the Department should be authorized (but not required) to approve the development, but only if the loss in fish production capacity is fully compensated through increased fish production capacity elsewhere. The compensation should take the form of new fish production capacity created by the developer, or cash sufficient to enable the Department to replace the equivalent of the lost productive capacity. Cash compensation should be paid into the Pacific Fisheries Conservation Fund (recommended below).**

Proposals should be considered under the referral arrangements and special review and approval procedures described below.

Compensation in the form of habitat improvement work would be particularly suitable where a developer, such as a forest company, has men and equipment that are capable of carrying out a function such as stream improvement in the locality in which they are working. Cash compensation will be appropriate when the offsetting measures to be undertaken would be best done by the Department, perhaps in other areas.

I emphasize that the decision as to whether compensation arrangements should be adopted in any particular case, and what form they should take, should rest with the government and not with the proponents of the development. And these measures should be applied cautiously, not as a substitute for, but as a necessary adjunct to, sound integrated resource planning (discussed below). Thus, compensation should not be invoked to accommodate damage to habitat that could be reasonably avoided or where it would be imprudent for biological or other reasons to sacrifice particular stocks.

In cases where cash compensation is to be paid, the amount should be determined according to the Department's estimates of the cost of replacing the lost fish production capacity. The money should be put into a fund earmarked for habitat development purposes.

4. **A fund should be created, called the Pacific Fisheries Conservation Fund, to be administered by the Department of Fisheries and Oceans. Money paid into the fund in the form of compensation for damage to fish habitat should be spent only on habitat improvement and other fish-production measures.**

These proposals are intended to ensure that the aggregate capability of the land and water in the Pacific region to produce fish will be maintained, while permitting the flexibility required to respond to other demands on habitat in particular places. They will focus attention on damage to habitat that can be identified in advance and are quantifiable in terms of lost potential fish production. They call for a concerted effort on the part of the Department to broaden its knowledge about how changes to fish habitat affect its fish production capacity. But imperfect information should not impede the direction of the reforms I have proposed here; it only calls for caution in applying them. The provincial Ministry of Environment has recently embarked on a similar course, with the creation of a wildlife Habitat Conservation Fund, which apparently is operating successfully.[9]

The Department's role in determining appropriate mitigation and compensation should be largely technical, involving estimates of the anticipated fish and habitat losses and prescribing remedial measures to offset them. Thus, the Department's attention should be focused sharply on biological and engineering considerations, where its expertise is strongest.

It is sometimes claimed that a proposed development will yield economic, social or strategic benefits that outweigh fishery losses that they cause, and that because these benefits take such an indirect form (through employment, foreign exchange earnings, national defense and so on) full compensation for damaged fish habitat should not be required. In such cases, the responsibility for making the necessary judgement rests squarely on the cabinet.

Accordingly, I recommend —

5. **If it is deemed to be in the public interest to exempt any development proposal from the provisions for mitigation and compensation in respect of damage to fish habitat, the decision should be made not by the Department but by the federal cabinet.**

Any such exemptions should be granted publicly and for explicit reasons.

Habitat Enhancement

Until recently, the main thrust of the Department's activities in habitat has been reactive and defensive, confined largely to fending off threats posed by various kinds of activities. But, as is noted in Table 3-1, funds under the Salmonid Enhancement Program have been devoted to improving fish habitat. As I recommend above, money paid into the Pacific Fisheries Conservation Fund should be earmarked for this purpose and related fish-production measures. Beyond that, the amounts to be provided for habitat enhancement should be determined by the criteria for projects under the Salmonid Enhancement Program, discussed in Chapter 5.

Integrated Resource Management

The Department's responsibility should be to properly manage the habitat available, to develop it further even at the expense of other values wherever this can be shown to be advantageous to Canadians generally, and to sacrifice it only when the loss is fully compensated in other ways.

Where an area of land and water supports other industrial activities as well as fish, an obvious need arises to minimize conflict among various competing interests. Therefore, as a general principle —

6. **The Department should be explicitly committed to the principle of integrated resource development planning and management.**

This has already been endorsed by the federal and provincial governments in their Salmonid Enhancement Agreement:

> . . .Canada and British Columbia agree that, in the implementation of the Program, they shall recognise the principles of integrated resource management practice.[10]

My recommendation implies broadening the federal commitment to this principle.

The referral process The Department participates in a variety of arrangements with other federal agencies, provincial ministries, municipalities, and private interests whose operations threaten fish habitat. Some 8,000 referrals of development proposals are received by the Department each year. The forest industry is the largest source; in 1981, timber-cutting permits alone accounted for over 2,000 referrals. These procedures are informal insofar as they have no legal consequences and are not specifically sanctioned under fisheries legislation.

In considering referrals that involve provincial resource agencies or municipalities, the Department usually deals with the relevant government agency. For example, timber-cutting applications by forest companies are referred by the Ministry of Forests to the Department for its assessment before the Ministry finally approves them. The Department suggests modifications it considers necessary to protect fish habitat; if accepted by the Ministry of Forests, these are incorporated into the cutting permits issued to the forest company. With variations, this same general approach is applied to mining operations, highways, dams, municipal developments and so on. For projects initiated by federal agencies, similar procedures apply and the Department participates in the Federal Environmental Assessment and Review Process for projects such as major harbour and airport developments.

The potential for avoiding damage to fish habitat offered by referral and other integrated planning procedures is considerable.

I therefore recommend —

7. **The Department should continue to participate in referral arrangements with provincial and other federal agencies.**

To ensure that the referral process is effective however, certain specific requirements must be met.

First, the Department will need information about the habitat that will be affected by a proposed development and about its sensitivity to disturbance. This underlines the importance of the habitat inventory program recommended earlier. (In Chapter 6, I discuss the need for expanded research on fish habitat and the effects of disturbances to it.)

Second, the Department must participate early in the planning of proposed developments in order to influence their design before commitments are made by other government agencies and private interests. Under current referral arrangements, the Department normally has little control over the timing of its involvement because it cannot respond until it receives a specific proposal. I regard this as a serious shortcoming of referral systems as they are now administered.

Third, the Department needs to become more involved in the field. While habitat inventory will help to identify problems and determine priorities, the Department's involvement in resource planning will be successful only if its staff is able to personally inspect sensitive sites to see first hand what is being proposed and to judge how it might affect the productivity of fish habitat.

Approvals With more than 8,000 referrals annually and with its present meagre resource information and staff, the Department cannot thoroughly review all of them. Under present arrangements the Department's contribution to resource planning tends to be uneven and often cursory, and proponents of developments often encounter lengthy delays.[11] In any event, most referrals do not pose serious threats to fish habitat, and the burden of reviewing all in the same detail should be avoided. To enable the Department to focus its attention and resources on those proposals that pose the most serious threats to fish habitat, I recommend —

8. **The Fisheries Act should provide both the Department and the operator of a proposed or existing development with the option of calling for a detailed review by the Department of its effect on fish habitat. To carry out such reviews, the Department should be authorized to require the operator to provide at his cost detailed plans, specifications and assessment studies of the development and to produce the necessary field data and other information it needs for this purpose.**

9. **Having reviewed a proposal, the Department should be authorized to reject it or formally approve it on acceptable terms and conditions. The approval should be given to the operator either directly, or indirectly through another involved government agency (such as the provincial Pollution Control Board or Ministry of Forests).**

10. **Terms and conditions of approvals should include mitigation measures to be taken by the operator. Where damage to fish habitat is unavoidable, the approval should also specify compensation (as recommended above).**

These arrangements will enable the Department to more effectively meet its responsibilities in protecting fish habitat by concentrating its attention on specific, critical developments. I propose in Chapter 18 that cooperative arrangements for dealing with referrals and approvals be set out in an agreement between the federal and provincial governments. Later in this chapter I propose strengthening the approvals by making them legally binding on both the Department and the developers.

Watershed studies The Canada Water Act,[12] which offers a mechanism for planning watershed development, has been used to a limited extent in the Pacific region for federal-provincial studies of the Fraser River estuary and the Thompson, Okanagan and Yukon basins. Such exercises have not generally provided much operational guidance for resource development, but they have produced valuable information about patterns of resource use and their interactions.

Because river basin and estuary studies of the kind carried out under the Canada Water Act and provincial regional planning procedures can be useful in identifying the relative values of activities in watersheds and potential conflicts among them, I recommend that—

11. **The Department should continue to participate in watershed studies in cooperation with other federal and provincial agencies.**

Such studies can also serve as focal points for detailed operational planning for the future.

HABITAT LEGISLATION AND ENFORCEMENT

The main and most powerful legal instruments for protecting fish habitat are found in the Fisheries Act.[13] Their development and application over the past decade has been a constant source of controversy, and their effectiveness and enforcement was a recurring theme in the Commission's public hearings.

Habitat protection requirements have long been a feature of the Fisheries Act. Provisions requiring fishways around dams and other obstructions and screens to be installed on water diversion intakes, have been in the Act for years. These requirements are relatively narrow in scope and apparently present no serious problems.

Prohibitions on Disturbing and Contaminating Fish Habitat

The Fisheries Act prohibits anyone from altering fish habitat (section 31) and from polluting it (section 33(2)).[14] These are by far the most controversial parts of the legislation. Amendments to strengthen these provisions in 1970 and 1977 were vigorously opposed by other industries and provincial governments. The Premier of British Columbia summarized his criticism as follows:

> The mutual objective of avoiding duplication of government regulations, particularly in relation to resource-based industries, will not be furthered by the proposed legislation. The close cooperation we have enjoyed in the environmental field may be jeopardized. The proposed legislation is oriented to a single resource - albeit of considerable importance to this Province - but is out-of-step with the multiple resource use essential to the development of a healthy economy in British Columbia.[15]

Section 31 broadly prohibits "any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat." Fish habitat is defined broadly, and since nearly all industrial operations in watersheds alter habitat in some manner, if only subtly, this section is very comprehensive. With special authorization, activities may be exempted from this general prohibition, but these provisions have not been invoked in the Pacific region.

The core of the pollution control provision is section 33(2), which prohibits the deposit of "a deleterious substance of any type in water frequented by fish" or anywhere else if it might enter such water. Since almost any substance can be deleterious to fish in sufficient concentrations, and all land drains into watercourses, this provision is comprehensive also.

Effluent discharges that fall within permissible concentrations specified in regulations are exempted. Such regulations have been adopted for six industries, the four major ones being pulp and paper, metal mining, chlor-alkali and petroleum refining. The standards apply nationwide. The Environmental Protection Service of the federal Department of the Environment, which has chief responsibility for administering section 33 (discussed below), in practice applies these standards rigorously only for new projects in consultation with the provincial Ministry of Environment. For plants that predated the regulations, they negotiate with the operators to establish a schedule for complying with regulations over a period of time. In the meantime, such projects are technically in default continuously. Site-specific regulations may also be adopted for individual projects, as was done for the controversial Amax Mine operation at Alice Arm.

Other provisions of the Act make polluters liable for costs incurred by the Crown in cleaning up unauthorized discharges of deleterious substances and for any resultant losses incurred by licensed commercial fishermen. In addition, the Minister is authorized to demand certain technical information from those whose activities contravene sections 31 or 33 or threaten to do so. With federal cabinet approval he may also require operations to be restricted, modified, or even shut down.

Operators are legally obliged to report any unexpected contraventions of these sections and to take any action required to prevent or remedy such occurrences. Anyone whose employees or agents contravene either section is liable unless the offence was committed without his knowledge or consent and he exercised 'all due diligence' to prevent it.

Penalties for violating these sections are the highest in the Fisheries Act (see Chapter 16, Table 16-5), with provisions for fines of up to $100 thousand for convictions under section 33 and for unlimited fines under section 31.

Because the federal government owns very little of the land and none of the fresh water that comprises the most critical fish habitat in British Columbia, it cannot protect the habitat by such means as licensing, leasing or similar arrangements. It therefore requires strong punitive legislation to protect fish habitat. And this legislation must also be comprehensive and exacting. Sections 31 and 33 of the Fisheries Act have these essential features, so despite criticism of them and in view of the attention that has been directed towards this question, I specifically recommend —

12. Sections 31 and 33(2) of the Fisheries Act should be maintained substantively intact.

I hasten to add that not all of the habitat protection provisions of the Act are satisfactory. They have been criticized for their narrowness and for failing to recognize other resource users or to provide for integrated resource planning and development.

> The Fisheries Act remains silent on the existence of other resource uses or users, and this places the (Fishery) Officers, in our opinion, in a very difficult position. The current referral process is working in spite of, not because of, the tunnel-visioned Fisheries Act. These Officers do a very commendable job, considering their legislated terms of reference.[16]

My proposals earlier in this chapter will alleviate some of these difficulties by providing better information for planning other activities in watersheds; by involving the fisheries authorities more deeply in integrated resource management planning; and, where damaging activities take place, by concentrating attention on the most serious threats and by providing for compensation where damage to fish habitat cannot be avoided. And in Chapter 21, I recommend that new fisheries legislation formally and explicitly authorize the Department to become involved in such planning.

But once the Department has received a proposal for a development and reached conclusions about the acceptable conditions under which it should proceed, any approval it issues should formally bind both the proponent and the Department. This is now lacking and is a serious deficiency in the referral system. The Minister has the authority to call for detailed project plans and to review them. But even when the developer makes modifications proposed by the Minister, he can remain liable to prosecution under the broad habitat protection provisions of the Fisheries Act. So do all those whose proposals have been referred to the Department, whether or not they have adopted the suggestion of fisheries officials to protect habitat. These arrangements leave operators in a constant state of uncertainty; even though their activities may have been endorsed by habitat protection officials, they remain potentially vulnerable under the Fisheries Act. And from the point of view of public administration, it leaves the review process too vague.

My recommendations on this matter are aimed at removing these deficiencies in the approval system.

13. All approvals of development proposals issued by the Department should enable their holders to proceed without being liable to prosecution as long as they comply with their terms and conditions. A general provision should empower the Department to curtail or suspend operations if fish habitat is significantly damaged or threatened by events that were unforeseeable at the time the approval was granted.

Thus, the operator would not be given *carte blanche* to operate in disregard to habitat once he has the Department's approval, but he would be able to place reasonable reliance on it. Conversely, the Department would assume some responsibility for the consequences of the terms and conditions it attaches to approvals. In all those cases where approvals are not issued, the provisions of the Fisheries Act should apply as they do now. Thus, developers would have strong incentives to avoid damaging habitat.

For pollution control, these site-specific procedures (for approvals recommended above) should replace the reliance on uniform standards such as those set out in the several industry sector regulations. Applying uniform effluent standards for the Pacific region, let alone the whole of Canada, is quite inappropriate. In some situations they will be too lax, in others too stringent, and they inevitably fail to take account of the peculiarities of each aquatic system. A stream rich in fish values needs a higher standard than one that is insignificant for fish; a small stream with limited dispersal capacity can assimilate less effluent than a large river; the quality of watercourses receiving many discharges can be maintained only with higher standards than one receiving few, and so on. Therefore I recommend —

14. The industry sector effluent regulations under section 33 of the Act should be rescinded for the Pacific region.

Such standards, if they are retained at all, should be used as guidelines in formulating site-specific approvals only, to be modified and applied for individual projects as circumstances warrant.

Finally, the present pollution control arrangements involve a great deal of duplication between the federal and provincial authorities. I consider it important that the federal government retain its independent authority to determine standards required for protecting fish, but administrative overlap and double permitting should be avoided. I therefore recommend —

15. For discharges of effluent for which provincial pollution control permits are issued, the Department's approvals should be integrated into the pollution control permits.

Public Consultation

With effluent discharges being approved through more site-specific procedures, the Department will need to gather complete information about proposed projects including information and advice from the interested public. Several participants in the Commission's public hearings criticized the federal government for failing to consult with the public before the special effluent regulations were approved for the Amax Mine:

> There was no offering of public input, no opportunity for public input by the Nishgas, either on the federal process leading to the special regulations, or in the provincial process, leading to the permit being issued by the Pollution Control Branch . . . .[17]

Clearly, the Department should be prepared to consider the views of members of the public who, through their interest in fisheries, might be affected by proposed major developments that impinge on the resource. I therefore recommend—

16. The Minister of Fisheries and Oceans (or his designate) should have the explicit authority to convene public hearings concerning any proposed project or development that might threaten fish habitat.

I do not propose that public hearings be required for all developments; many are too small or their potential effects on habitat too trivial to warrant full public review. But I urge the government to exercise this authority in all other cases unless another agency convenes hearings that provide an opportunity for the Department to explain the development's fish habitat implications.

Habitat Enforcement Issues

General enforcement requirements are covered in Chapter 16. The specialized enforcement unit I propose there would be responsible for habitat offences. Here, I consider certain matters relating specifically to enforcement of habitat protection legislation. These are monitoring, the due diligence defence and the procedures followed in laying charges.

Monitoring At the Commission's public hearings the Department was frequently criticized for failing to monitor industrial operations once they had been assessed through referral procedures. I view this as a serious shortcoming. Moreover, my recommendations in this chapter for mitigation and compensation for habitat damage, and for formal Departmental approval of projects and developments, will call for even greater attention to monitoring. Thus—

17. The Department should develop, in cooperation with the province, a program to ensure systematic monitoring of all industrial and other operations in the Pacific region that have the potential for inflicting significant damage to fish habitat.

In developing this program the Department's habitat managers should work closely with enforcement officers. And opportunities will likely arise for mutually advantageous cooperation between federal and provincial authorities in the monitoring effort.

Due diligence I explained earlier that a person charged with a habitat offence may be acquitted if he exercised due diligence over his employees or agents in trying to prevent it. Courts have applied a similar rule even in the absence of such explicit relief in environmental legislation.[18] Some participants at the Commission's hearings suggested that relief of this nature should be eliminated, and that offenders should be held absolutely liable for damage to fish habitat regardless of the circumstances or the efforts of an accused to prevent it. While such a change might have a salutory deterrent effect for some operators, I am concerned that it would impose an unreasonable hardship on others whose employees or contractors, due to unforeseeable circumstances and despite their honest efforts to avoid it, damage fish habitat. Furthermore, I understand that courts typically have hesitated to grant acquittals on these grounds. So there appears to be no immediate danger that these provisions will be abused and I suggest that they be retained.

Charging procedures Charges for violating the habitat protection provisions of the Fisheries Act are normally laid after a fishery officer or citizen has observed an offence. Under current administrative arrangements, fishery officers are left with relatively wide latitude to decide whether or not to formally lay a charge.

Because of their strength and broad scope, the habitat protection provisions are difficult to apply consistently without creating serious disruptions in industrial activities in the region. This gives rise to the following paradox: because they are so strong and uncompromising, their breach becomes common and their effect is inconsistent and often weak; yet they leave anyone who operates in a watershed or discharges waste potentially liable to a charge, usually at the discretion of a fishery officer, who sometimes reacts to local pressures and attitudes.

Earlier in this chapter I proposed that the habitat protection prohibitions in the Fisheries Act be retained to enable the federal government to vigorously assert its interest in fish habitat. But with this broad power goes a responsibility to enforce the law objectively and consistently. This calls for a careful review before charges are laid.

18. Before charges are laid under the habitat protection provisions of the Fisheries Act, the circumstances should be reviewed by senior regional officers of the Department, including the Director General, the Director of the Habitat Management Branch and the Chief of Enforcement to ensure consistency in applying the law.

The Department also has a responsibility to provide guidance to those who must comply with the law about how they must conduct their operations to avoid prosecution.

19. The Department should produce operating guidelines to assist industrial operators in avoiding damage to fish habitat, and the extent to which such guidelines have been adhered to should be considered before charges are laid.

The Department has already produced an excellent handbook for use by forest operations;[19] similar ones should be produced for other activities as well.

ORGANIZATION AND ADMINISTRATION OF HABITAT MANAGEMENT

The Canadian constitution does not assign exclusive responsibility for environmental matters to either the federal or the provincial government; legislation has been enacted and programs are administered by both. While many of these are not aimed explicitly at protecting fish habitat, they have the incidental effect of doing so. And within the federal government, legislation and administrative arrangements that bear on habitat protection are a patchwork.

Division of Federal Responsibilities

Among federal agencies, the Department of Fisheries and Oceans is the most heavily involved in protecting fish habitat. It actively enforces the habitat provisions of the Fisheries Act (those prohibiting activities that are harmful to fish habitat and the deposit of deleterious substances into water) as well as those that require fishways around stream obstructions and screens to be installed on water-diversion intakes.

The Department is not the only federal agency involved in habitat protection, however. It shares administrative responsibility over some important federal controls, and others lie beyond its authority altogether. The Environmental Protection Service of the federal Department of the Environment is the most centrally involved of these other agencies. Even though the Department of Fisheries and Oceans was formed in 1979 with primary authority over fisheries, the Environmental Protection Service has continued to administer the deleterious substance section of the Fisheries Act alongside the Department. In addition, it administers the federal Ocean Dumping Control Act,[20] aimed at marine dredging and other activities at sea that are harmful to fish or human health.

This division of responsibility impedes effective and systematic habitat management. The involvement of both agencies in administering the deleterious substance provisions of the Fisheries Act has led to unnecessary duplication of effort and facilities within the federal government and raises the disquieting prospect of conflict between them. And since the application of the Ocean Dumping Control Act is confined largely to protecting fisheries, it too results in duplication. I see no need for two federal agencies in these areas. Accordingly, I recommend that—

20. **Exclusive administrative responsibility over all habitat protection provisions in the Fisheries Act and over the Ocean Dumping Control Act in the Pacific region should be assigned to the Department of Fisheries and Oceans, together with related staff and funds.**

The Department of the Environment also administers the Canada Water Act (referred to above); the Environmental Contaminants Act,[21] aimed mainly at regulating the use and disposal of insidious industrial chemicals; the Pest Control Products Act,[22] which provides for the control of insecticides and related similar toxic substances; and the Clean Air Act,[23] which deals with acid rain, among other things. Although these enactments contribute to fish habitat protection, they also serve wider objectives. The same is true of the Environmental Assessment and Review Process, the mechanism for reviewing the environmental impact of major federal projects, which is also coordinated by the Department of the Environment. I see no need to disturb the existing administrative arrangements for any of these programs and initiatives.

Federal responsibilities for dealing with spills of oil and other hazardous materials are divided. Since 1971 the Environmental Protection Service has attempted to provide a coordinated federal response to emergencies and has developed a fairly sophisticated national program for preventing and reporting spills, for contingency planning and research and for developing technology to deal with spills. The primary statutory authority, however, is the Fisheries Act. Responsibility for cleaning up spills of oil from ships rests with the Department of Transport under the Canada Shipping Act[24], although responsiblity for protecting the environment when such spills occur (even from chemicals used for clean up) rests with the Department of Fisheries and Oceans and the Department of the Environment. This allocation of responsibilities is cumbersome and needs to be rationalized. I therefore recommend—

21. **The federal arrangements for dealing with spills of oil and other hazardous materials should be reviewed in an effort to rationalize the division of responsibilities among departments and agencies.**

This review is urgent because the transfer of full responsibility for section 33 of the Fisheries Act to the Department of Fisheries and Oceans, as recommended above, could lead to further confusion and conflicts with the Department of the Environment.

For the Yukon Territory, additional interdepartmental relationships have to be considered and I deal with these issues in Chapter 20.

Departmental Organization and Resources

Habitat-related work in the Pacific region is done by three separate branches within the Department of Fisheries and Oceans and by other federal departments, international commissions and the provincial government. The main agencies involved and the resources devoted to fish habitat protection are summarized in Table 3-1.

Table 3-1 Resources devoted to fish habitat management in the Pacific region, 1981-82

agency	manpower (person-years)	budget (millions of dollars)
Department of Fisheries and Oceans		
Field Services Branch		
Habitat Division	42	1.8
Fishery Officers	42	1.4
Research Branch	21	0.9
Salmonid Enhancement Program	30	3.7
	135	7.8
Department of the Environment		
Environmental Protection Service	50	2.0
International Pacific Salmon Fisheries Commission	10	0.3
British Columbia Fish and Wildlife Branch	70	2.3
total	265	12.4

Source: Information provided by the various agencies.

In the headquarters of the Department's Pacific region, a habitat division of the Field Services Branch has the main responsibility for habitat protection. (A recent decision to elevate this unit to the status of a branch, and to change its name to the Habitat Management Branch, reflects a concern to strengthen its capabilities.) In the field, fishery officers, who report through area managers, enforce habitat legislation as well as perform resource management responsibilities. The Fisheries Research Branch conducts habitat-related research in Nanaimo and West Vancouver. The Salmonid Enhancement Program, based in Vancouver, is directly involved in habitat improvement projects. The International Pacific Salmon Fisheries Commission conducts research and habitat-improvement work on the Fraser River system. And, as explained later in this chapter, the provincial Fish and Wildlife Branch is involved in habitat management and enforcement as well. Altogether, about 265 person-years and more than $12 million are currently being directed annually to fish habitat protection, management and improvement in the Pacific region.

Many participants in the Commission's hearings have maintained that the budgetary commitment to habitat protection in the Pacific region is inadequate. Certainly, the Department of Fisheries and Oceans is stretched too thinly to adequately discharge its heavy responsibilities in this area. Limited by insufficient staff and lacking proper habitat inventory information, the Department cannot hope to cope with the large and rising volume of referrals it is asked to consider annually, or to adequately monitor industrial operations.

In Chapter 19 I recommend that all of the Department's staffing and budgetary commitments for programs in the Pacific region be analyzed in relation to its priorities. Pending completion of this analysis, I propose that the staff allocated to habitat management be strengthened at least to the level committed before cuts were made in recent years:

22. **As an interim measure, the habitat management staff of the Department's Pacific region should be increased by about 10 person-years in addition to the staff to be transferred from the Environmental Protection Service and those required to compile the proposed habitat inventory.**

Participants in the Commission's hearings pointed out that the Department's fishery officers need more support from biologists who have the local scientific knowledge needed to assist with planning and referrals relating to forestry and other resource developments in watersheds. Only if fishery officers can receive such support can continuity and consistency be achieved in setting and enforcing standards for habitat protection. Decentralizing professional staff will strengthen this kind of support and improve communications between field personnel and senior management. I therefore recommend —

23. **A core of technical experts should be maintained in the Habitat Management Branch in Vancouver to deal with major impact assessments and estuary and water management studies, but the balance of the branch should be decentralized and be responsible to area managers.**

There also appears to be insufficient coordination between the Habitat Management Branch and the Salmonid Enhancement Program. It has been suggested that the efforts of these two groups would be more effective if they developed a closer working relationship or perhaps were integrated into one group. Similarly, the transfer of habitat research a few years ago from the Habitat Protection Branch to the Fisheries Research Branch might be reconsidered. These issues cannot be dealt with in isolation from the Fisheries Research Branch and the Salmonid Enhancement Program organizations, so they should be examined in the general review of the Pacific region activities recommended in Chapter 19.

Provincial Involvement in Habitat Management

In British Columbia, the provincial government's policies for allocating and managing Crown land, timber, minerals and water have a predominant influence over the health of fish habitat. In addition, the province exercises important controls over water and environmental quality in general. The challenge is to harmonize federal and provincial activities in this area, to strengthen the habitat management effort, and to avoid unnecessary duplication of effort and sources of friction.

The province is indirectly involved in habitat management through various statutes relevant to environmental controls. One of these is the Pollution Control Act,[25] administered by the Waste Management Branch of the Ministry of Environment. With a few specific exceptions, the legislation requires a pollution control permit to discharge wastes or contaminants into water or air. Objectives have been developed for abatement standards required by various industries, and permits are usually based on these. Permits sometimes incorporate requirements recommended by the Department of Fisheries and Oceans and other federal authorities under the referral arrangements described earlier.

The provincial Water Act[26] asserts the ownership of the provincial Crown of virtually all fresh water in the province and requires users to obtain licences to divert, store or withdraw water. The Act lists the beneficial uses of water but, conspicuously, no mention is made of fish. The potential for conflict between the Province's water-licensing policies and fisheries values was recently illustrated in court action over the release of water from a hydroelectric water-storage facility in the northern interior.

Another important provincial statute is the Environmental and Land Use Act,[27] which provides for a provincial cabinet committee to review proposed industrial and other developments and to reserve sensitive areas. The recently passed Environment Management Act[28] provides the Ministry of Environment with emergency powers as well as authority to require mitigation and abatement of adverse environmental impacts and environmental assessments.

While none of these provincial laws is aimed explicitly at fish and aquatic habitats, the way they are applied can have a major influence over them. The administering agencies employ a wide range of regulations, administrative policies and practices in support of the statutes, and these too have an important influence on fish habitat.[29]

The province's direct involvement in fish habitat arises through its administrative authority over freshwater species delegated to it by the federal government. The Fish and Wildlife Branch of the Ministry of Environment considers development and project referrals in the same manner as the Department of Fisheries and Oceans (sometimes reviewing the same proposals); it enforces the habitat protection provisions of the Fisheries Act for freshwater species and sometimes for anadromous fish where its staff observes infractions in the field.

Federal-Provincial Coordination

With overlapping constitutional responsibilities and administrative arrangements, effective habitat management calls for liaison and cooperation between the federal and provincial governments. At the technical and administrative levels and in the field, a great deal of informal cooperation has evolved between the two governments' agencies. But these working arrangements are not supported by formal agreements, and they sometimes break down, leading to recurrent confrontations over such developments as the pulpmill at Kamloops, log driving on the Stellako River, proposed dams on the Fraser River, estuary projects, and logging operations like the one at Riley Creek. This friction is frustrating for the public officials involved and does not augur well for systematic protection of fish habitat.

Significantly, the Department acknowledged this problem seven years ago in a submission to the Royal Commission on Forest Resources of British Columbia, with reference to the referral process.

> The [Fisheries] Service welcomes the opportunity to maintain a direct liaison and active participation in this system of integrated resource management. However, critical liaison procedures are not consistently established or well defined.[30]

This deficiency persists today.

Both governments appear to recognize the need to harmonize their approaches to environmental protection and to reduce duplication, confusion and conflict. The main alternatives that have been suggested involve constitutional realignment, delegation and a federal-provincial agreement. I have assumed, for the purposes of this inquiry, that the present constitutional division of governmental responsibilities will prevail, which focuses attention on the other two options.

Delegation to the province Delegating administrative responsibilities to the province involves leaving the lawmaking power with the federal Parliament while assigning to the province the authority for administering the legislation. This is the arrangement under which British Columbia now takes responsibility for freshwater fisheries. And authority to administer the federal Fisheries Act in Ontario and Quebec has been formally delegated to those provinces.

This solution helps to eliminate conflict in administrative arrangements, but for habitat management in the Pacific region it raises several problems. First, the province, with its greater interests in other, conflicting, resource industries such as forestry, mining and hydroelectric power, might be inclined to compromise the protection of fish habitat.

Second, the present federal and provincial statutes (especially the federal Fisheries Act and provincial forest legislation) take such divergent approaches to resource management that they are likely to be difficult to administer jointly within the same government.

Third, as I emphasize in Chapter 4, the Department of Fisheries and Oceans must formulate long-range fisheries plans aimed explicitly at fish-production targets. To meet these, the Department must have direct influence over habitat quality; otherwise, any potential gains in production from increased levels of spawner escapement, stock enhancement and other management techniques could be thwarted through eroded habitat. In short, the agency responsible for managing fish should also have authority over fish habitat.

Federal-provincial agreement Reconciling the often conflicting interests and responsiblities of the two governments is a formidable political and administrative problem. But as long as the constitutional division of authority remains as it is now, the general direction of needed reform is clear: arrangements must be made to improve intergovernmental coordination. Both governments have a common objective in protecting fish habitat, as repeatedly indicated in public statements. This common purpose is formally declared in their joint Salmonid Enhancement Agreement, of which a main objective is "to preserve, rehabilitate and enhance" natural stocks.[31] Their efforts must be brought together in a coordinated and efficient way to establish a clear framework with acceptable standards and orderly procedures and to eliminate duplication of effort and sources of friction.

Environmental accords have now been entered into by the federal government with all provinces except Newfoundland, Quebec and British Columbia. Through these, the province agrees to enforce environmental requirements (such as pollution control standards) that are at least as stringent as those required under federal regulations. Procedural arrangements are designed to avoid duplication, to enable provincial authorities to be the main channel of communication with the private sector, and to undertake joint programs of research and development. They incidentally offer the federal government a large degree of flexibility in dealing with various provinces. Each accord can be designed to mesh with provincial environmental protection procedures and tailored to reflect the nature of fisheries resources regionally. I should stress, however, that my recommendations earlier in this chapter point to the need in this region for a site-specific approach to regulating effluent discharges, instead of the heavy reliance on uniform industry sector regulations that characterizes arrangements in other provinces.

I have concluded that a formal agreement between the governments of Canada and British Columbia offers the best hope for coordinating their policies and programs for habitat management in the province. Because there are numerous outstanding jurisdictional issues that should be addressed under an umbrella federal-provincial agreement (including the Salmonid Enhancement Program, mariculture and ocean ranching, and regulation of the processing sector) I have devoted Chapter 18 to this subject.

A major element of the agreement should be an expression of the need for joint action by the two governments to improve the protection and management of fish habitats. It should address the need for integrating salmonid enhancement with habitat protection; coordinating habitat management with other natural resource activities; providing for federal participation in provincial resource planning processes; assembling data compatible with the needs of provincial resource planners; coordinating federal and provincial responsibilities for fish habitat in inland waters; and integrating federal habitat protection requirements into provincial pollution control permits and resource tenure documents.

CONCLUSION

To properly manage fish habitat, certain conditions must be fulfilled. First, the Department must have information about the resources it is expected to protect and manage. This is alarmingly deficient at present, and I have proposed this be corrected through a systematic habitat inventory sponsored by the federal and provincial governments. Equally necessary is information about the impact of activities in watersheds on fish productivity; this too is lacking, and I discuss the needed research in more detail in Chapter 6.

Second, the managers need objectives. These are now conspicuously lacking also; resource managers have hitherto simply been responding defensively to the initiatives of others. With better information about the capabilities of the habitat and opportunities for improving it, the Department will be in a position to set itself goals for fish production by regions and watersheds. This will focus the efforts of habitat managers, enhancement planners and fisheries managers; it will force other resource agencies to recognize the implications of their long-term objectives for those of fisheries; and it will provide a touchstone for assessing the effects of proposed developments.

Third, the Department needs the legal and procedural machinery for engaging systematically in integrated resource management through close cooperation with provincial resource agencies and improved approval arrangements.

Finally, the Department needs the wherewithal in staff and budget to carry out its heavy responsibilities in this area. Savings and efficiencies could be realized by eliminating duplication of effort among federal departments and by reconciling federal and provincial administrative responsibilities, as I have suggested. But, in addition, a stronger staff and budgetary commitment must be made if the Department is to deal adequately with the huge task of protecting the habitat of Canada's highly sensitive Pacific fish in the face of massive and widespread industrial activities.

Commentators on the subject of habitat protection are often gloomy about the future, and they can find justification for pessimism in past experience. But my investigations have left me much more optimistic about the possibilities, not only for preserving the capabilities of our aquatic resources to produce fish, but also for enhancing them.

FOOTNOTES

1. British Columbia Wildlife Federation, Exhibit #144, p. 2.
2. United Fishermen and Allied Workers' Union, Exhibit #138, Conclusion, p. 1.
3. Nuu-chah-nulth Tribal Council, Exhibit #160, p. 6.
4. Unpublished Manuscripts. Ten-year review meeting and workshop, Carnation Creek Watershed Program. Malaspina College, February 24-26, 1982.
5. Fraser River Estuary Study Steering Committee, Fraser River Estuary Study Summary. Queen's Printer, Victoria, 1978.
6. Potential Pacific Coast Oil Ports: A Comparative Environmental Risk Analysis. Department of Fisheries and Environment, Vancouver, 1978.
7. Northwest Falling Contractors Ltd. v. R., 1981, Volume 53, Canadian Criminal Cases (2d) 353 (Supreme Court of Canada).
8. Department of Fisheries and Oceans, Exhibit #157, p. 8.
9. Environmental and Social Impact Compensation/Mitigation Guidelines. Province of British Columbia, Environment and Land Use Committee Secretariat, July, 1980.
10. Federal-Provincial Agreement: Salmonid Enhancement Program. Memorandum of Agreement signed by the Minister of Fisheries and Environment for Canada and the Minister of Environment for British Columbia, March 1, 1979, p. 8.
11. Council of Forest Industries of British Columbia, Exhibit #135, p. 12: Association of British Columbia Professional Foresters, Exhibit #95, p. 8.
12. Revised Statutes of Canada 1970, First Supplement, Chapter 5.
13. Revised Statutes of Canada 1970, Chapter F-14.
14. Section 33(3), which purports to prohibit the deposit of logging debris into streams, has been ruled unconstitutional: R. v. Dan Fowler, (1980) Volume 32 Criminal Reports 230 (Supreme Court of Canada).
15. Letter from the Premier of the Province of British Columbia to the Prime Minister of Canada, April 27, 1977.
16. Exhibit #135, p. 8.
17. Nishga Tribal Council, transcripts of the Public Hearings, Volume 39, p. 7994.
18. R. v. City of Sault Ste. Marie. 1978, Volume 85 Dominion Law Reports (3d) 161. (Supreme Court of Canada).
19. D.E.A. Toews and M.J. Brownley, A Handbook for Fish Habitat Protection on Forest Lands in British Columbia. Land Use Unit, Habitat Protection, Field Services Branch, Department of Fisheries and Oceans, May, 1981.
20. Statutes of Canada 1974-75-76, Chapter 55.
21. Statutes of Canada 1974-75-76, Chapter 72.
22. Revised Statues of Canada 1970, Chapter P-10.
23. Statutes of Canada 1970-71-72, Chapter 47.
24. Revised Statues of Canada 1970, Chapter S-9.
25. Revised Statutes of British Columbia 1979, Chapter 332. The Waste Management Act was passed by the legislature in 1982 to replace the Pollution Control Act, but at the time of writing it had not yet been proclaimed.
26. Revised Statutes of British Columbia, 1979, Chapter 429.
27. Revised Statutes of British Columbia, 1979, Chapter 110.
28. Statutes of British Columbia 1981, Chapter 14.
29. L. John Alexander, "Legal Provisions for Linked Management Systems." A report submitted by the Management Systems Sub-Committee of the Fraser River Estuary Study. Vancouver, 1981.
30. "The Implication of Forest Tenure on Forest Resource Protection in British Columbia." Prepared for the Royal Commission on Forest Resources, Department of the Environment, Fisheries and Marine Service, Vancouver, 1975.
31. Federal-Provincial Agreement.

CHAPTER 4

FISHERIES MANAGEMENT

It is not enough to say that the fisheries will be managed for the greatest benefit of those in the industry and for Canada. We must know what that means in operational terms.

FISHERIES COUNCIL OF CANADA[1]

Conservation and management of fish resources entail two fundamental responsibilities. One is preserving the habitat that fish depend upon, the subject of the preceding chapter. The other is controlling the harvest in order to conserve the stocks, which is the subject of this chapter. I have already drawn attention in this report to some apparent failures in fisheries management. Most dramatic was the collapse of herring stocks in the late 1960s, but declines of halibut stocks earlier in the century and depletion of a number of important salmon stocks in more recent times have been no less important.

Earlier in the century, fisheries management was concerned almost exclusively with conservation issues. The guiding principle was attaining a maximum sustainable yield (MSY)[2] from individual stocks. But as pressures on resources increased, and many stocks were threatened by excessive fishing, attention became focused on the allocative aspects of management, the management of people and vessels as well as fish. This shift in emphasis was noted in a 1976 federal fisheries' policy paper:

> The guiding principle in fishery management no longer would be maximization of the crop sustainable over time but the best use of society's resources. "Best use" is defined by the sum of net social benefits (personal income, occupational opportunity, consumer satisfaction and so on) derived from the fisheries and the industries linked to them.[3]

But while the policy paper prescribes a comprehensive goal, the best use of society's resources, it does not indicate how this should be attained. And certainly the archaic Fisheries Act offers no guidance.

Working with insufficient knowledge of stock sizes and population dynamics, under heavy pressure from competing groups of fishermen, and with inadequate control over fishing activity, management has in many respects been reduced to a series of desperate attempts to meet the demands of vocal user groups without visibly destroying the resource. This is acknowledged by the Department:

> In the past, escapement targets have often been compromised on the basis of compelling social considerations .... or because of run failure.[4]

The attention directed to meeting user demands detracts from the Department's capacity to deal with the more fundamental responsibilities of stock conservation, so relieving these pressures is important if management capabilities are to be upgraded. In later chapters I deal with arrangements for allocating fishing privileges, and I propose that these functions be separated administratively from resource management activities.

APPROACHES TO MANAGEMENT

For the most important species on the Pacific coast, particularly salmon and herring, the basic objective of management is to control harvesting so that the number of spawners will be sufficient to regenerate the stocks. For species available for harvesting throughout most of their life span, such as most groundfish, shellfish, and chinook and coho salmon, management also aims at harvesting the fish at the age and size that will yield the greatest catch in terms of weight ("yield per recruit" management). For this purpose, size limits, gear restrictions and time and area closures are used. Management strategies also take account of interactions between stocks and between species, and the extraneous effects of environmental variations.

Salmon

On the Pacific coast, the biggest task is managing salmon. Salmon are unusually vulnerable to fishing because they are available for harvest over large parts of their migratory routes to the spawning grounds and, in the case of chinook and coho, during much of their lives at sea as well. The salmon fleet, coupled with recreational and Indian fishing, has the capacity to decimate runs, so effective management calls for tight control of fishing to ensure adequate escapements. This is an immensely complicated task because of the multitude of stocks, each with its unique capacity to sustain exploitation; because stocks often intermingle on the fishing grounds; and because all salmon are so vulnerable to overfishing.

The International Pacific Salmon Fisheries Commission is responsible for managing Canadian and United States fishing for sockeye and pink salmon within a convention area that includes Juan de Fuca Strait, outer Puget Sound, lower Strait of Georgia and the Fraser River. All other fisheries (including those for coho, chum and chinook salmon in the convention area) are the direct responsibility of the Department of Fisheries and Oceans. The Department divides its responsibilities among three divisions: the South Coast Division covers Juan de Fuca and Georgia Straits and the west coast of Vancouver Island; the North Coast Division covers the north and central coast and the Queen Charlotte Islands; and the Fraser River-Northern B.C.-Yukon Division covers the Fraser River itself (including the estuarial commercial fishing area) and the small fisheries in the transboundary rivers of Yukon (see also Chapter 19). But, for the troll fishery, most policy decisions are made at the Director General level because the relevant stocks intermingle, and Canada and the United States cooperate informally in managing chinook stocks coastwide.

Herring

Herring, like other small pelagic fishes, are relatively short lived, prone to violent fluctuations, notorious for stock collapses and difficult to manage. Before the stocks collapsed in the mid 1960s, their rate of rejuvenation was believed to be relatively affected by the abundance of spawners, but there is now little doubt that overfishing caused stocks to collapse. When most stocks recovered in the early 1970s, it was hoped that production could be restored and maintained with larger spawning populations. But recruitments have been variable; and under the intensive exploitation of the roe-herring fishery, the stocks seem to be unstable.

The major challenge to herring managers is in regulating the roe-herring fishery. (The catches in the food, bait and other herring fisheries are relatively small.) Fishing takes place on or near the spawning grounds, where the fish are highly vulnerable; the fishery is short and intense, and the stocks are exploited by a fleet with enormous excess capacity — all of which makes this fishery difficult to manage.

For purposes of roe-herring fishing, the coast is divided into three broad management zones (the north coast, the Strait of Georgia, and the west coast of Vancouver Island), and the licensing system divides the fleet among these zones. Within these zones, 34 specific herring areas have been identified; these are the effective management units, where fishing openings are declared if sufficient spawning stocks appear. Some units are only an inlet or bay; others, especially in northern waters, encompass a broad range of coast. The Department's approach is to set a target for spawner escapement in each unit, to monitor the spawning populations as they aggregate on the grounds, and to permit harvesting of the populations surplus to the escapement target.

Other Species

The other species on the Pacific coast present varying management difficulties. As I explained in Chapter 2, the pressure of fishing has had a heavy impact on some stocks. The halibut stocks, despite the efforts of the International Pacific Halibut Commission, have declined and remain depressed. In contrast, many of the traditional species (Pacific cod, lingcod and flatfish) are relatively fast growing and short lived; and, at present, they do not appear to be in danger of overexploitation.

A third group of groundfish species has only recently begun to be exploited by Canadian fishermen; these include a new fishery for walleye pollock, a trap fishery for sablefish and a trawl fishery for Pacific hake

Because groundfish stocks are available for fishing throughout most of the year, harvesting is not as hectic as in the salmon and herring fisheries, and regulatory problems are consequently less difficult. Nor have the resources attracted as much excessive fishing pressure from Canadian fleets as have the major fisheries.

The Department has taken advantage of these less demanding circumstances to develop a well-based, conservative management regime that appears to be working well. Data collection and scientific analyses on traditional groundfish stocks is particularly well developed.

Management of the wide variety of shellfish, crustacea and other invertebrate species depends on a variety of regulatory techniques, but because the stocks are numerous, small and widely scattered, their management is not as intensive as other fisheries.

For the most part, management of these minor species has been based on sparse information about stock sizes and productivity, and so it has been exploratory in nature. Improved biological information on invertebrate stocks would undoubtedly improve the prospects for developing these fisheries. And since the value of landings in these minor fisheries has approached that of groundfish in recent years, a more systematic approach to their management is warranted.

Elements of Fisheries Management

Fisheries management has five essential elements:

i) Compiling and analyzing information on the dynamics of fish populations.

ii) Formulating long-term plans and strategies for each stock or group of stocks, involving goals with respect to the number of spawners required to produce maximum sustainable yields and the best harvesting techniques.

iii) Establishing pre-season goals with respect to the amounts and types of fishing to be conducted (pre-season fishing plans).

iv) Developing the arrangements for regulating fishing during the fishing season (in-season management).

v) Evaluating the results of the programs to measure their effectiveness and to provide improved information on which future management programs can be built.

These five elements provide a framework for evaluating existing fisheries management programs and identifying opportunities for improvements. The first of these is dealt with in Chapter 6. There I explain the deficiencies in the data required for analyzing stocks, particularly for salmon where research in support of management has recently deteriorated. Here I merely note that unless the information base is adequate, the fisheries cannot be effectively managed. The remainder of this chapter assesses the provisions for the other elements of management.

LONG-TERM PLANNING

Management, like other aspects of fisheries policy, needs to be directed toward well-defined, long-term objectives. Specific targets for fish production cannot usually be specified with certainty, but it is important to set them, nevertheless, in order to guide managers and provide a context for designing short-term fishing plans. And through experience, the targets can be continuously reevalutated and adjusted. At present, the Department lacks such explicit long-term objectives for most species, and while the deficiency cannot be corrected immediately, it should be given high priority. Accordingly—

1. **The Department should formulate and publish long-term plans and objectives for managing each of the major species and for ensuring the most beneficial utilization of the resources. These objectives should include quantitative targets for production by species and management regions.**

Salmon

For salmon, because of their importance and complexity, such long-term plans and objectives are especially urgent. Moreover, with the exception of the Salmonid Enhancement Program discussed in Chapter 5, no long-term objectives or strategies have been adopted for salmon management. In the late 1970s, the Pacific region established resource boards to plan and coordinate the important Pacific coast fisheries; and I understand that two years ago the Salmon Resource Board produced a set of objectives for levels of salmon production to be attained through improved fisheries management, habitat protection and enhancement. But its report is still being reviewed internally. A new attempt is being made by the Department to pursue the board's initiative by developing a long-term salmon management plan. Thus, while some effort has apparently been directed toward planning, no proposals have yet been adopted.

The considerable opportunities for developing the salmon fisheries call for long-term planning that encompasses and integrates all the activities associated with salmon production and harvesting, including stock management, habitat protection and enhancement. Major changes in fisheries organization and in management approaches will be necessary, and this will require the involvement and cooperation of the fishing community and the general public. To begin this process, the status of stocks, the problems associated with managing the salmon fisheries and options for future management should be identified and explained in more specific detail than has been possible in this report. This should be done regardless of the government's response to this Commission's other recommendations. I therefore recommend —

2. **To provide the background information needed to formulate long-term plans for salmon, the Department should prepare and publish within 12 months a salmon resource analysis, documenting the condition of the stocks, the opportunities for developing them and an outline of the options for future management of the salmon fisheries. The document should include —**
   i) **An assessment of the state of the salmon stocks in as much detail as information allows and an appraisal of the adequacy of this information.**
   ii) **A review of the problems arising from current fishing patterns.**
   iii) **Alternative proposals for improving conservation through modifying fishing and management practices.**
   iv) **A review of the implications of enhancement plans for effective fisheries management techniques.**

The last of these arises from the problems associated with salmonid enhancement reviewed in the next chapter.

This resource analysis will provide the basis for informed consultation with the Pacific Fisheries Council (proposed in Chapter 17) and others with a view toward designing a long-term salmon management plan. Thus —

3. **By 1985, in anticipation of the regional reorganization of the commercial salmon fleet (recommended in Chapter 9), the Department should formulate and publish a long-term plan for salmon fisheries management. This plan should contain quantitative targets for salmon production by species and management regions based on full utilization of the existing productive capacity of the natural habitat and enhancement opportunities.**

Preparation of these documents should, of course, take advantage of the preparatory work already undertaken by the Salmon Resource Board.

In later chapters I propose major changes to reduce the excessive fishing capacity of the commercial salmon fleet, to control the pressure of sportfishing on vulnerable stocks, to improve information and research, and to begin a systematic inventory of freshwater habitat, along with other measures to improve management capabilities. These measures should be regarded as prerequisites for any future salmon management program, and should not await the formulation of the detailed plan recommended here.

Other Species

Several difficulties complicate the task of developing long-term plans for the herring fisheries. Market conditions are highly variable because of the volatility of herring production around the world; the immense overcapacity of the fleet severely constrains management flexibility; and some uncertainty remains about the biology of the stocks. Managers of our herring fisheries can do little about international fluctuations in markets. In Chapter 9, I deal with the problem of overcoming excessive fleet capacity, and in Chapter 6, with the need to overcome the uncertainties about the stocks.

Another difficulty in developing long-term plans is the controversy over how to achieve maximum substainable yields. Some scientists recommend managing the harvest to provide for an equal spawning escapement every year despite fluctuations in the stock; others suggest maintaining the harvest, leaving the escapement to vary. We have little evidence to show the relative efficacy of the different techniques, and so management policy lacks a firm scientific foundation. These questions should be resolved as quickly as possible, and the most effective way of doing so is through careful experimentation. I therefore recommend —

4. **The long-term plan for herring management should include provision for experimenting with alternative management strategies to determine their relative effectiveness in maximizing long-term yields.**

Some other basic biological questions plague the management of herring. In Chapter 6 I note, for example, the uncertainty about the discreteness of herring stocks and the interdependence of herring and salmon stocks. Such questions must be resolved by biological research.

Little effort has so far been directed toward developing long-term plans and strategies for groundfish. The current emphasis on monitoring, analysis and cautious exploitation appropriate for this relatively new fishery should provide the foundation for more well-defined long-term plans in the future.

SHORT-TERM PLANNING

Long-term plans provide direction and guidance for short-term seasonal planning, which involves pre-season plans, in-season management and post-season evaluations.

Pre-season plans

For some years the Department has produced general pre-season fishing plans to meet tentative harvest objectives and to achieve desired spawning escapements. For the last two years, pre-season fishing plans for commercial fishing have been published in the form of a Commercial Fishing Guide.[5] They provide initial guidance for the Department's field staff responsible for in-season regulation of the fisheries and supplementary field programs.

Salmon For salmon, the Commercial Fishing Guide provides estimates of expected and optimum escapements for each species in each statistical area, and the expected fishing regime for the ensuing year.

The plans are based on expected abundance, timing and migration routes of the returning runs, estimated spawning requirements, aspirations of fishermen and policy objectives. Present policies give first priority to biological needs, second to the requirements of the Indian fishery, and third to the commercial and recreational fisheries.[6] Within the latter two groups, the balance of interests among seiners, gillnetters, trollers and sport fishermen is considered. Fishing plans also take account of Canada's international arrangements with the United States.

Salmon managers face four major difficulties in developing the pre-season plans. First, they seldom know with much confidence how many fish will enter a fishery. Second, they cannot reliably predict the time the stock will enter the fishery. Third, they do not know how many vessels will participate in a particular fishery. The highly mobile fleet in the salmon fishery responds quickly and often unpredictably to fishing opportunities along the coast. Sometimes managers refrain from planning openings for small runs because of the threat of excessive fishing effort being directed to the available stocks. Fourth, information about the stocks and their spawning requirements is so weak that the escapement targets are little better than guesses.

The Department has also encountered administrative difficulties in formulating fishing plans. A serious frustration has been the government's failure, from time to time, to legally proclaim the planned regulations in advance of the fishing season. Another is the lack of flexibility available to the Department in defining areas for openings and closures for management needs. These impediments to effective fisheries management must be eliminated, as I propose in Chapter 21.

Herring In designing pre-season plans for the herring fishery, the Department's scientists predict the abundance of incoming herring runs and suggest catch levels and targets for spawning stocks. The catch levels are often reduced by the management officials before being published in the Roe-Herring Management Plan set out in the annual Commercial Fishing Guide. Anticipated catches are shown separately for each of the three licensing zones (but not for the 34 individual management areas within those zones.) The management plan also indicates the Department's intentions regarding the division of the catch between the seine and gillnet fleets and the basis on which notices will be given for openings and closures in each gear type.

Until the basis for predicting the abundance of herring is improved, the pre-season plan must remain very tentative. It is nevertheless critically important because the anticipated catch levels become, in effect, upper limits on the permitted catch. Field managers often constrain catches below the anticipated levels during a season, but they are usually very reluctant to allow catches to exceed them, closing the fishery once they have been attained even though they are often less than the catches initially recommended by the scientific staff.

Other species The Department's provisions for pre-season planning for the groundfish fishery provide a model for other fisheries. Scientists prepare a biennial publication (with updatings in the intervening years) containing assessments of the groundfish stocks and recommendations for management. This document is reviewed by Departmental administrators who then prepare a draft fishing plan. The scientific assessments and the draft fishing plans are reviewed at public meetings in Prince Rupert and Vancouver, and with the Groundfish Advisory Committee. Following these consultations, the Department publishes a final Pacific Groundfish Management Plan in the Commercial Fishing Guide, and this becomes the basis for regulation in the ensuing season.

Improving pre-season planning The Department's new effort to provide advance guidance to managers and fishermen about fishing expectations through the published fishing guide is commendable. However, for the salmon and herring fisheries particularly, pre-season planning suffers from two weaknesses that warrant attention. One is the vagueness of the plans. They are at best only rough indications of what can be expected in the season ahead. This is because of the poor biological data on which the predictions are based, a problem I return to in Chapter 6.

The other is the narrowness of criteria considered in formulating plans. In Chapter 6 I explain that biologists, in preparing stock assessments for planning purposes, present only a single recommendation about fishing strategy and thereby pre-empt the final decisions. Instead, they should analyze alternatives, so that senior administrators can select plans that take account of factors other than biology.

Thus I recommend —

5. **Pre-season planning should be based on an examination of alternative management strategies prepared in the course of the annual scientific assessment of the stocks.**

In-Season Management

The field forces of the Department, coordinated through the central office in Vancouver, are responsible for implementing the annual plans and regulating the fisheries during the fishing season. In-season management involves monitoring the fisheries and making appropriate changes in fishing plans. For the salmon and roe-herring fisheries, this presents especially formidable challenges.

Salmon In-season management for the salmon fishery involves monitoring the passage of the runs through the fisheries and altering the fishing patterns as required when runs deviate from predicted patterns. Openings and closures are manipulated by area and gear, and final adjustments are made by regulating the catch of the last, most inshore, fishing activity.

Managers conduct daily reviews of catches and the number, type and distribution of fishing vessels. Incoming information is analyzed with reference to three basic questions: whether the stock size is the same as predicted; whether the timing of the run is as predicted; and whether the catching efficiency of the fleet is consistent with expectations.[7]

These questions give rise to difficulties in practice. The magnitude of runs, even in relative terms, cannot usually be assessed until the fish actually enter the fishery, and variations in timing and migratory patterns create major assessment problems. To determine whether or not the regulations are achieving their objectives, assessments are made of escapements as well. In many areas this involves estimating the number of salmon reaching the spawning grounds; but, in some cases, earlier information is needed, and estimates are made of the fish leaving the fishing area.

If the fishery is progressing as predicted in pre-season plans, little or no change will be made. However, when conditions vary significantly from those predicted before the season, managers take remedial action by varying the days or hours of fishing. This indicates the importance of pre-season planning.

Depending on the importance of needed changes in fishing plans, final decisions may be made by the Area

Manager, the Director of Field Services, the Regional Director General, or even the Minister; then the fishing fleets are notified. Throughout the season, managers organize surveillance and enforcement to ensure compliance with the regulations.

There is little consistency in the methods used. In some areas management decisions depend on the personal knowledge and intuitions of the fishery officer and little data. In others, sophisticated techniques of test fishing, computer modelling, and electronic fish counting are used. But in all cases, there is an alarming lack of documentation on how management decisions are made; what information is used, how it is interpreted and the results obtained. The absence of clear guidelines, procedures and documented results makes it difficult to evaluate the process, and it also impedes progress in this crucial part of the Department's responsibilities.

As the pressure on salmon stocks has increased, their conservation and management has become increasingly sensitive to detailed in-season decisions. Today, with the sophisticated and powerful salmon fleet, the consequences of a management error can be severe, as the Department acknowledges:

> When there were four or five days fishing per week, a one day change in fishing time had relatively little impact, whereas in the short openings of today, a one day change can be of major consequence. For example, extension from four to five days fishing is only a 25 percent increase in fishing time, wheras extension from one day to two days is a 100 percent increase with commensurate removal of fish likely to occur. An error in judging stock strength or catching efficiency in the latter situation will be of considerable consequence. The impact on escapement could be dramatic.[8]

To cope with present needs and the new challenges that can be expected, major improvements in the management system will be necessary at both organizational and technical levels. First, an organizational center is needed to focus and coordinate in-season management activities in each major area. I therefore recommend —

6. **In each area, a salmon management unit, reporting to the Area Manager, should be formed and assigned responsibility for in-season management of the salmon fisheries.**

These units should collect information on the composition of catches, fleet activities, escapements and the need for regulatory changes. Each unit should be provided with necessary biological support staff (on a seasonal basis if necessary).

In-season information on catches and fishing effort now flows to and from different fisheries in a haphazard way. To capture data on catch and vessel activities quickly, and to analyze this information so that managers can have an almost instantaneous preliminary picture of developing conditions in each fishery, obviously requires efficient channels of communication and automated data collection. An example of the kind of program needed is the integrated data system developed by the State of Washington wherein preliminary information from sport, commercial and Indian fisheries is fed into a centralized data system and processed to provide a continuously updated picture of the fisheries as they develop. Managers in the field, equipped with remote terminals, are provided with continuing information for management purposes.

In 1970, a study group recommended a complete overhaul of the Department's statistical collection and storage system, and a similar recommendation was made by a team of consultants in 1980.[9] In view of the urgency of upgrading management capabilities, I recommend that these improvements be made without further delay:

7. **The Department should, as expeditiously as possible, upgrade the statistical collection processing and storage system for in-season salmon fishery management, taking full advantage of advanced technology in data processing and remote terminal accessibility.**

Gathering information only with respect to the commercial fishery will be insufficient. As I explain in Chapter 15, the sport fishery, particularly in the Strait of Georgia, requires careful monitoring; accurate and timely information on catches is needed on a continuing basis. Similar provisions must be made for reporting catches in the Indian fishery.

> There is a need to maintain a better record of the harvesting of the marine resources in order to complete the full picture. Information on cash buying, sport fishing catches, and Indian food fisheries is not precise. This inadequate information leads to wrong conclusions and decisions being made by the resource managers and scientists. While precise harvesting information is difficult and expensive to collect, more emphasis should be placed on this aspect of management.[10]

In addition to better reporting of catches as they occur, test fishing in front of, within and behind the fishing grounds can provide valuable information on the strength of runs and their times of passage through the fisheries. Expert advisors to this Commission emphasized the value of such information and strongly advocated expansion of test fishing. If organized on a charter basis, however, test fishing is expensive. An alternative policy is to issue short-term permits (of the kind I propose in Chapter 8) to a limited number of vessels authorizing them to carry out test fishing according to strict standards of control and reporting, with compensation being in the form of catches. I recommend that these possibilities be investigated:

8. **The Department should explore the feasibility of test-fishing programs in which commercial fishing vessels conduct experimental fishing according to Departmental specifications in return for all or part of their catches.**

My advisors suggest that as much as 10 percent of the catch could be taken in test fisheries and that the resulting improvements in stock management and utilization could well enable total catches to be increased by this amount (so that test fishing would not necessarily encroach on other fisheries). I explain in Chapter 6 that tagging provides crucial information about the composition of the stocks, and this can usually be done in conjunction with a test-fishing program.

Herring In-season management of the frenzied roe-herring fishery is exceptionally difficult. Probably the weakest part of management is the collection of information on stock abundance. A month or so before herring are expected to spawn, patrol vessels and chartered fishing vessels use echo-sounders to locate and assess the size of stocks. As fishing vessels assemble in a fishing area, fishermen also sound for fish, supplementing the information collected by the Department's vessels.

Echo-location is a difficult technique, and interpretation of readings is a skill that can be acquired only with experience. Because the roe-herring industry is new, and turnover among fishery officers has been high, this critical element in management has often been clouded by uncertainty. In view of the importance of in-season stock assessment, the system must be better organized and the results clearly documented.

Even with area licensing, the fishing power of the fleet that converges on openings is immense, far exceeding the capacity needed to harvest the available catch. Consequently, openings are often very short (a few hours or even minutes) and the fishing is frantic. Timing is crucial. Harvests must be taken just before the fish spawn, and for this purpose, samples of the stock are taken to measure the roe content and ripeness. Fishery officers must restrain the fleet until the appropriate moment, often under heavy pressure from fishermen. Unless a very conservative approach is taken, the system is prone to disaster, and overexploitation or harvesting at the wrong stage of maturity can easily result. Fear of such outcomes causes fishery managers to be so cautious that stocks are often underharvested or not fished at all for fear of depleting them.

In recent years fishery managers have, for the most part, successfully restricted harvests within the levels prescribed in pre-season plans, though experience has varied considerably among areas. But regulatory activities in the field are rarely planned on a scientific basis and the results almost never documented. As in the salmon fishery, the absence of a coherent system for orderly decision making is a conspicuous deficiency.

Improving in-season management for salmon and herring The provisions for managing the salmon and herring fisheries during the fishing season should be more systematic. I propose that the coordinator for each of these fisheries should initiate a thorough review of in-season management procedures. Thus—

9. **The Department should thoroughly review its provisions for in-season management of the salmon and roe-herring fisheries with a view toward establishing systematic procedures, including—**
    i) **Specifications for in-season field programs of test fishing and monitoring.**
    ii) **Procedures for recommending and authorizing in-season variations in regulations.**
    iii) **Procedures for ensuring full documentation of in-season investigations, regulatory actions and appraisals of their results.**

Improving in-season management will call for upgrading the staff's technical capabilities. To this end, in Chapter 19, I recommend improved training arrangements for fishery officers and other management personnel.

I am particularly concerned to eliminate the pressures now put on field managers during the fishing season over allocating catches among competing fishing groups in the salmon and herring fisheries. Catch allocation is a highly contentious issue that extends far beyond the field manager's responsibilities for regulating harvests and escapements, and ought not to be left to him to decide in the heat of the fishing season. Hitherto, field managers have had to deal with unreasonable pressures in this respect and, as the Department has acknowledged, escapement targets have often been "compromised."[11] The end result is bad management.

To relieve field managers of these pressures I propose in later chapters a general policy for allocating catches. The more detailed allocation decisions should be made at senior levels within the Department. Field managers should be left to deal with the technical means of achieving harvest and escapement targets; and, in the context of annual post-season evaluations, their success should be judged on these grounds.

ANNUAL EVALUATION AND REVIEW

At present there are no provisions for documenting and evaluating management decisions. Ultimately, this is the greatest deficiency in the present fishery management system. Without written assessments on the status of the stocks, continuing compilations of catch and escapement data, and appraisals of the effects of regulatory changes, it is not possible to objectively evaluate the success or failure of management decisions. Managers are unable to learn from their own and others' mistakes; critical appraisal of performance is restricted; and duplication of effort results. The overall effect is retarded progress in developing management capabilities.

As the steward of Canada's fish resources the Department has a responsibility to report on its activities, to document and evaluate its past season's program, to explain actions proposed for the ensuing season, to consult with fishing groups affected and to publish its plans. I therefore recommend that—

10. **The Department should implement an annual review and consultation as part of the process of formulating management plans for each fishery. This should include —**
    - **i) An annual scientific assessment of the status of the stocks and of the effects of the fisheries upon them.**
    - **ii) An evaluation of the preceding year's fishing plan including the changes made to it, estimates of catches of major stocks and spawning escapements.**
    - **iii) A review of this information with the relevant fishery advisory committee (see Chapter 17), and subsequent preparation of a fishing plan for the next season indicating the targets for catches and spawning escapements in each fishery.**

The Department must assemble this information for management purposes in any event. By systematically publishing it in the way proposed, the Department would provide the documentation needed for meaningful consultations with fishing groups prior to designing final preseason plans. With efficient procedures for in-season data collection, much of the documentation can be routinely compiled by the computer once the appropriate format has been established, without adding an onerous burden in report preparation.

The innovations I have recommended above will complement reforms I propose in later chapters relating to the organization of research (Chapter 6), administration (Chapter 19), and consultation (Chapter 17). The general objective is to provide a clear and consistent structure for decision making with guidelines and terms of reference at each level in order to eliminate the present vague goals and ambiguous responsibilities.

FISHING ORGANIZATION

Management of both the salmon and roe-herring fisheries is complicated by several distinctive fleets that compete for the available catch and a variety of ways of harvesting. In the roe-herring fishery the gillnet and seine fleets harvest with different gear and in different locations, and controversy surrounds their biological and economic implications. For salmon, the issue is even more complicated, because a wider variety of gear is used and the fish can be taken in different places along their migratory routes. A particularly sharp debate focuses on where and when salmon should be caught; and although this question has no single answer, it deserves brief commentary here.

Ideally each salmon stock would be fished and managed separately, according to its specific yield capabilities and spawning requirements. But most salmon fisheries involve mixtures of stocks migrating through an area. The fisheries generally fall into three general harvesting patterns: *sequential fisheries*, where stocks are fished at several points along their migration routes; *terminal fisheries*, where stocks are harvested as they congregate near spawning streams; and *sport and troll fisheries*, which operate on diffuse and changing mixtures of stocks, with complex relationships associated with migration and maturation patterns.

For stock management purposes, the sequential fishing pattern is the most manageable because it provides a sequence of opportunities to reassess abundance and to adjust catches and escapements. However, few fisheries now are managed in this way because knowledge about the composition of the stocks is weak. But with improved information many more stocks would be amenable to this type of harvesting and management.

The terminal fishing pattern implies different things to different people. To some, it means harvesting the stocks as they arrive at their spawning sites, which in some cases are hundreds of miles upstream. Indian fisheries are sometimes of this kind, and some hatcheries also harvest excess stocks in this way. To others, it means harvesting the fish at the mouths of rivers as they leave the sea. And to others, it means simply moving the commercial fleet further inshore.

Support for terminal fisheries generally rests on three grounds. First, they improve the economy of fishing by eliminating the need for a large offshore fleet. Second, they enable more discriminating management and harvesting of discrete stocks as they approach their spawning grounds. Third, they confine the catch to mature fish and, hence, increase production.

However, terminal fisheries present certain difficulties. A fishery at the mouth of a river does not always enable fishing of discrete stocks. On large rivers such as the

Fraser, for example, different stocks often mingle as they enter the river, giving rise to mixed fisheries with all their attendant problems. Furthermore, because salmon often pool, or wait several days at the mouth of a river before moving upstream, regulating the catch of a large fleet at this point is more difficult than regulating the catch from a stock being fished in a sequential pattern. The problem is compounded if information about the stocks is weak, so managing terminal fisheries requires much better resource information than is now available. Finally, some species of salmon, particularly chum, deteriorate in quality as they approach their spawning streams, so some of the economic advantages of terminal fishing would be offset by diminished product value.

Notwithstanding these difficulties, terminal fishing appears to hold some promise for fisheries management. But surprisingly little study has been made of the opportunities. The variety of possibilities for directing fisheries to stocks further along their migration routes clearly warrants investigation.

The sport and troll fisheries present the most awkward management difficulties. These hook and line fisheries operate on mixed stocks where migration and maturation patterns are complex, creating severe problems for in-season management. Moreover, certain chinook and coho stocks are exploited continuously throughout their life cycles in these fisheries, making them especially vulnerable to depletion — a problem I return to in a later chapter.

Opportunities for reorganizing patterns of hook and line fishing, especially sportfishing, are limited, and so in-season management capabilities are particularly important. This need will become much more urgent if enhancement efforts succeed in increasing fish abundance, since that will attract more fishing effort and tend to frustrate attempts to rehabilitate wild stocks. The hook and line fisheries, therefore, must be the focus of intensified management and in-season regulation.

Other changes in the organization of fishing and in the structure of fishing fleets would assist management. Clearly, a substantial reduction in the fleet's size would facilitate management and would reduce the adverse impact on escapements of errors in decisions about openings and closures. And area licensing would eliminate some of the present uncertainty about the size of the fleet likely to converge on any opening. But the feasibility of such changes will depend on other considerations, discussed elsewhere in this report. More modest proposals for improvement include coordinating openings in different areas to spread the fleet, and clarifying allocation objectives to prevent pressures from various sectors from interfering with escapement targets. These matters must all be considered in long-term salmon management planning of the kind proposed earlier in this chapter.

INTERNATIONAL ASPECTS

This Commission's terms of reference exclude arrangements between Canada and foreign nations, so I make no recommendations on these matters. But Canada's arrangements with the United States bear on the management of Canadian salmon fisheries in two important respects that warrant comment here.

First is the long-term relationship emerging between Canada and the United States. For decades, management problems and friction have arisen from fishermen of each country intercepting salmon bound for the other country's rivers. Negotiations toward a long-term agreement for cooperation are progressing, and for the past two fishing seasons the Department has cooperated with management authorities in the States of Alaska and Washington to limit interceptions and to improve conservation. It is widely hoped that these efforts will soon lead to a new international agreement. In any event, formal or informal cooperative arrangements will create increased needs for information on the stocks and will add new dimensions to Canadian management programs. And they will make more urgent the need to improve the Department's technical capabilities and effectiveness.

Second is the relationship between the Department and the International Pacific Salmon Fisheries Commission, which is responsible for managing sockeye and pink salmon on their southern approaches to the Fraser River. The commission has a reputation for efficiency, good relations with the fishing communities in both countries, and for effective protection of the resources under its jurisdiction. But a serious problem arises from the salmon commission's mandate to deal only with sockeye and pink salmon, even though substantial numbers of other salmon species mix with the Fraser sockeye and pink stocks. Arrangements for integrating the commission's activities with the Department's efforts to conserve and manage other species, especially chinook, do not appear to have been effective.

The salmon commission and the Department cooperate to some extent in field work, but communication and coordination between their technical staff is limited: exchanges of ideas and data are constrained. The isolation of these two agencies working side by side on the same Canadian river cannot be conducive to the most effective resource management.

CONCLUDING OBSERVATIONS

Present systems of fisheries management have evolved pragmatically in response to the circumstances of various fisheries, the kind and quality of information that could be obtained and the controls available to managers. These systems have worked with mixed success. In the groundfish and invertebrate fisheries, pressures on the resources have been limited and, for the most part, managers have been able to assemble sufficient information to guide exploitation and conserve the stocks. But the pressures on these stocks are growing, and in order to take advantage of the new opportunities while protecting the resources themselves, management capabilities will have to improve.

The most conspicuous management weaknesses are in our most valuable fisheries — salmon and roe-herring. Both suffer from serious deficiencies in long-term planning; in the data needed for effective in-season management; in the methods of processing and analyzing information so that it becomes available to managers systematically and quickly; and in the scientific input into management decisions. A regular review of plans and results with those participating in the fisheries is also needed. My recommendations are aimed at correcting these deficiencies.

FOOTNOTES

1. Fisheries Council of Canada, Exhibit #91, p. 7.
2. It should be noted that the size of a population of fish that will produce the maximum sustainable yield is smaller than the maximum population size, which can be maintained only without exploitation. See W.E. Ricker, Stock and recruitment, Journal of the Fisheries Research Board of Canada, Volume 11, 1954, pp. 559-623.
3. Policy for Canada's Commercial Fisheries. Fisheries and Marine Service, Department of the Environment, Ottawa, May 1976, p. 53.
4. Department of Fisheries and Oceans, Exhibit #193a, p. 9.
5. See for example, 1982 Commercial Fishing Guide, Proposed Fishing Plans and Stock Expectations. Department of Fisheries and Oceans, Pacific Region, Vancouver, 1982.
6. Exhibit #193a, p. 5.
7. Exhibit #193a, p. 9.
8. Exhibit #193a, p. 16.
9. DPA Consulting Limited, "Review of Pacific Region Statistical System Final Report." Prepared for the Department of Fisheries and Oceans, 1980.
10. The Canadian Fishing Company Limited, Exhibit #73, p. 3.
11. Exhibit #193a, p. 9.

CHAPTER 5

SALMONID ENHANCEMENT

> *The future strength and natural diversity of our salmonids should be maintained through an appropriate balance of hatcheries and more natural approaches to salmonid enhancement. The preservation of wild stocks must be the management priority of the next decade.*
>
> SPORT FISHING INSTITUTE OF BRITISH COLUMBIA[1]

In the introductory chapter to this report I noted that the dependence of our predominant fish resource, salmon, on rivers and streams at the beginning and end of their life cycles gives rise to both problems and opportunities. The major problem is that their spawning habitat is vulnerable to being disturbed by industrial activity on the adjacent lands, pollution, diversions and obstructions of waterflows, and other environmental damage described in Chapter 3. The major opportunities are twofold. First, the reliable return of anadromous fish to their natal streams toward the end of their life makes them potentially easy to harvest and manage. Second, it leaves the stocks highly amenable to enhancement through improving spawning beds and constructing facilities that increase the productivity of spawning fish. This chapter deals with the Salmonid Enhancement Program and its prospects for significantly increasing salmon abundance.

The major Salmonid Enhancement Program began in 1977, but efforts to build up salmon stocks on the Pacific coast began a century ago.[2] According to the annual reports of the Department of Marine and Fisheries (as the federal department was then called), a request from Ottawa in 1882 led to construction of the first hatchery in British Columbia on Bon Accord Creek at Port Mann in the lower Fraser Valley. This hatchery produced sockeye and chinook salmon. In the decades that followed, many experimental projects were undertaken with various types of hatcheries and fishways. Unfortunately, most of these projects, especially hatcheries, were unsuccessful and short lived; in fact, all salmon hatcheries were closed in 1937. Only after World War II was a concerted federal effort made to rehabilitate and enhance the fisheries.

In the two decades following the war, major fishways to help salmon upstream were constructed on the Fraser, Bulkley, Nass, Cowichan, Somass, Sproat, Indian and Naden Rivers. The most ambitious and probably the most successful project was the fishways built at Hells Gate which began operation in 1945. It was jointly financed by Canada and the United States under the auspices of the International Pacific Salmon Fisheries Commission, which was established to manage and rehabilitate Fraser River sockeye stocks after they had been devastated by slides caused by railroad construction through the canyon decades earlier.

The first spawning channel was built at Jones Creek in 1953, and during the next two decades additional projects of this kind were constructed at Robertson Creek, Big Qualicum River, Weaver Creek, Seton Creek and on the Babine River system. Some of these were very costly. The Babine Lake Development Project, involving flow control and spawning channels on the Fulton River and Pinkut Creek during the late 1960s, cost roughly $10 million and is the largest spawning channel project in the world. The Robertson Creek facility was later converted to a hatchery and has proven highly successful in producing chinook and coho salmon.

Because of early disappointments, hatcheries received little attention for several decades. But during the 1970s, the focus on hatcheries was renewed. Following a pilot hatchery constructed on the Big Qualicum River to test new techniques, the first modern large-scale salmon hatchery in British Columiba was completed in 1972 on the Capilano River near Vancouver. This $3 million project, producing coho and chinook salmon and steelhead trout, is considered to be one of the most successful hatcheries in the world. A second major hatchery was completed on the Quinsam River in 1975. At the present time 10 salmon hatcheries are operating in British Columbia and 5 are under construction.

THE ENHANCEMENT PROGRAM

Early in 1974, the Department sponsored a policy development seminar in Vancouver to examine the opportunities for increasing salmonid (i.e. salmon and anadromous trout) production. Participants included fishing industry representatives, the academic, scientific and financial communities as well as federal and provincial officials. The assembly concluded that a cost recoverable program to increase the production of salmonids to historic levels was feasible and that such a program should proceed immediately.[3]

The following year the federal Cabinet authorized the expenditure of $6 million over two years to develop a comprehensive enhancement plan, and also authorized the minister responsible for fisheries to enter into an agreement with the Province of British Columbia to implement cooperative planning. Later in 1975, the federal Minister of Fisheries and the Environment and the provincial Minister of Environment signed a Memorandum of Understanding dealing with arrangements for cooperation in formulating an enhancement program.

In 1977 the federal Minister of Fisheries announced a two-phase Salmonid Enhancement Program aimed at doubling the stocks of salmon and anadromous trout to their former levels of abundance, implying an increase in annual production of 150 million pounds. From the beginning, the second phase was to be dependent upon the success of the first. The formal agreement between the Minister of Fisheries and Oceans for Canada and the Minister of Environment for British Columbia was signed on March 1, 1979.[4]

Program Objectives

The agreement is designed to facilitate cooperation between the federal and provincial governments in the planning and implementation of the program. It states that

> . . .Canada and British Columbia agree that the Salmonid Enhancement Program must be so designed as to be capable of achieving specified economic, social and environmental goals; taking into account and fully respecting the legitimate interests of other natural-resource users; . . .[5]

Thus, while the purpose of the program is "to preserve, rehabilitate and enhance natural salmonid stocks," this is considered to be a means of achieving certain specific economic and social objectives, namely—

i) To augment national and provincial income.
ii) To create employment opportunities for Canadians.
iii) To improve economic opportunities for Native Peoples.
iv) To foster development of economically disadvantaged communities and regions.
v) To increase and improve recreational opportunities.

The agreement also calls for a high degree of public involvement and a "vigorous program" to foster public awareness of the need to conserve salmonid resources and their habitats. The ultimate goals of the program are thus clearly specified.

The governments agreed that the program would be carried out in two phases. Phase I was originally planned as a five-year program running from 1977 to 1982, but was subsequently extended by two years to 1984. For this phase, the federal government committed $150 million and the province $7.5 million, "subject to funds being made available by the Parliament of Canada and the Legislature of British Columbia."

The production target for Phase I is to increase the catch of salmon by 50 million pounds annually. To achieve this, a wide range of techniques provide for restoring freshwater habitat, including stream rehabilitation and removal of obstructions; fishways to assist migrating fish past barriers to upstream spawning areas, artificial spawning channels to provide optimum conditions for reproduction, hatcheries and other incubation systems to increase the productivity of spawning fish, and lake enrichment to increase the rearing capacity of natural lakes for young salmon.

Two other provisions of the agreement are particularly important: the provision that both governments could recoup their expenditures on the program through levies on users of the resource (the federal government committed itself to do so, the provincial government did not); and the provision that the two governments will restrain further investment in the fisheries to ensure that the potential economic gains from increased fish production are not dissipated in higher costs.

Organization

The joint agreement provided for the Salmonid Enhancement Board, which gives advice to the federal and provincial Ministers on the general direction and management of the enhancement program, and on annual budget allocations. The board consists of three federal and two provincial senior officials, and seven nongovernmental members. With the exception of provincial members, all are appointed by the Minister of Fisheries and Oceans. The nongovernment members are chosen for their special expertise in resource management and are not intended to be delegates of any particular interest group.

The board receives advice regarding the program's general direction from the Salmonid Enhancement Task Group, which consists of 27 members and represents various interest groups and regions in British Columbia. Sport fishermen, native Indians, commercial fishermen and processors, other resource industries and tourist groups are among those represented. It is funded by the Salmonid Enhancement Program and maintains an elected executive committee and an executive secretary. The chairman is a member of the Salmonid Enhancement Board and thus provides an avenue of communication between the two bodies.

The enhancement program is administered by an executive director, who reports jointly to an Assistant Deputy

Minister of Fisheries and Oceans and the chairman of the enhancement board. Staff and resources are provided under a special Treasury Board allotment, described in Chapter 19.

This structure and its separation from the line operations of the Department's Pacific region reflects the special character of the enhancement program: it expends funds from two governments, and must report to both; it is funded by special allocations, which are scrutinized closely by both Treasury Boards; and the program is intended to be cost recoverable.

Designing the enhancement activities begins with individual project proposals, which are then grouped into alternative program plans, on the basis of their "enhanceability," "manageability" and "desirability." To determine enhanceability, staff biologists and engineers investigate potential projects to establish the adequacy of water supplies, land sites, brood stocks and other physical requirements to determine the project's feasiblity, costs and potential production.

Concurrently, to determine manageability, each project is examined by one of the Geographic Working Groups comprised of senior federal and provincial biologists, district supervisors and habitat protection officers. These specialists assess proposals in terms of their potential adverse impacts on other stocks, and recommend appropriate modifications. The desirability of projects is assessed largely by evaluating their economic cost effectiveness and their regional impacts.

Enhancement Targets and Expected Achievements for Phase I

Consistent with the program's economic and social objectives noted earlier, the following specific targets were established for the first phase:

i) To increase the average annual production of salmonids by 50 million pounds, with the composition of this increase expected to be as shown in Table 5-1.

ii) To achieve an overall ratio of benefits to costs of 1.5:1, with a net contribution to the national income of 325 million in 1980 dollars.[6]

iii) To provide benefits of 200 million in 1980 dollars in the target area, which is British Columbia excluding the lower mainland and southern Vancouver Island region.

iv) To provide the equivalent of 64 person-years of continuing employment for Indians.

v) To generate 458 person-years of new employment in the construction and operation of enhancement facilities.

These targets were based on the assumption that the federal commitment to the program would be 150 million in 1976 dollars over a five-year period. But in fact the allocations to Phase I will be 150 million in current dollars, spread over a seven-year period. These funds are expected to provide purchasing power equivalent to only 78 million in 1976 dollars, or about 52 percent of that originally envisaged. The program's achievements must be assessed in this light.

By the end of the 1981/82 fiscal year, about $107 million of the $150 million budgeted by the federal government for Phase I has been expended (see Table 5-3), and the remainder is expected to be spent over the following two years. In addition, about $4.3 million of the $7.5 million in provincial funding was expended by the end of the 1981/82 fiscal year.

Fish production capacity According to reports of the Salmonid Enhancement Program, at the end of March 1982, projects with a capacity to produce 31.2 million pounds of adult fish were already completed or operating. This new capacity is in the form of 15 major and 14 minor facilities, 14 community-development projects, about 100 small projects, the varied efforts of some 7,000 volunteers, and fertilization of 12 lakes.

The species composition of the expected production is indicated in Table 5-1. About half the total increase is expected to be in sockeye salmon, resulting largely from lake fertilization; a substantial part of the remainder is in chum salmon, reflecting successful adaption of Japanese-style chum hatcheries.

Table 5-1 Targets and expected production for Phase I

species	target	production capacity March, 1982	expected production capacity by end of Phase I	expected production as percentage of initial targets
	— millions of pounds —			
sockeye	9.0	13.1	16.9	187
chum	28.9	11.6	16.0	55
pink	3.8	1.4	1.4	37
coho	2.4	1.4	2.9	120
chinook	5.7	3.3	5.8	101
steelhead and cutthroat	0.2	0.4	0.4	200
total	50.0	31.2	43.4	87

Source: Unpublished data provided by the Department of Fisheries and Oceans.

By the end of Phase I, in 1984, the capacity to produce 43.4 million pounds of salmon annually is expected to be in place. This is 87 percent of the target for the first phase, and represents varying expectations for individual species as shown in Table 5-1. Given the eroded purchasing power of funds to a little more than half that on which the targets were based, the program's expectations for fish production are highly satisfactory.

Economic performance Current estimates by officials of the Salmonid Enhancement Program suggest that Phase I will ultimately generate net national income benefits of 77.4 million in 1980 dollars, about one-quarter of the original target.[7] (In the remainder of this chapter many of the costs and benefits are expressed in 1980 dollars for consistent comparison of values.)

The overall benefit-cost ratio of 1.3:1 also falls short of the projected 1.5:1. (This means that $1.30 in fish values will be generated for each $1.00 expended, measuring all benefits and costs in dollars of equal value and discounting them as required to take into account the time at which they occur.) Benefits to the target area will be about 40 percent of the original target, at $78.3 million. The estimated continuing employment that will be provided to Indians is 32 person-years, half the target. And the employment generated in constructing and operating enhancement facilities is estimated at 623 person-years, exceeding the target by more than one-third. The current projections of net benefits, by major program component, are given in Table 5-2.

Table 5-2 Anticipated economic achievements of Phase I

program component	government cost	net national income benefits	benefit-cost ratio
	millions of 1980 dollars		
major projects	94.8	78.0	1.4:1
lake fertilization projects	9.0	48.5	2.4:1
minor projects[a]	15.0	-7.3[b]	0.6:1[b]
community development projects	21.2	-4.8	0.8:1
public participation projects	0.5	0.9	1.9:1
provincial projects	11.3	-10.2[b]	0.1:1[b]
unallocated overhead costs	27.7	-27.7	—
total[c]	179.5	77.4	1.3:1
original target	211.5[b]	325.0	1.5:1

[a] Includes minor engineering projects, small stream improvement projects and pilot projects.

[b] Expected production from some projects in these categories beyond Phase I is excluded and therefore the net benefits and benefit-cost ratios are understated.

[c] The estimated purchasing power in 1980 dollars, of the funds expended during Phase I.

Source: Unpublished data from the Salmonid Enhancement Program.

The lower expectations for national income gains, target area benefits and Indian employment are partly attributable to the shrunken purchasing power of the funds available for the program. But there are other reasons as well. Rising construction costs have led to higher cost estimates and hence lower net benefit estimates. The estimated contribution to national income has been reduced because the estimated cost of harvesting and processing the enhanced production has been revised upward on the basis of new information. In addition, resources have been diverted toward enhancing depressed chinook stocks and away from projects that indicated higher economic benefits.[8]

However, several unexpected developments have had beneficial economic effects. Lake fertilization is expected to be an exceptionally economical means of enhancing sockeye production (at least if the results obtained in the Great Central Lake experiment can be replicated elsewhere); Japanese-style chum hatcheries have proven more successful than anticipated; and community development projects have been effective in involving Indian communities with high unemployment. Furthermore, a substantial volunteer labour force has been marshalled to undertake some projects at low cost.

Table 5-2, which gives the program components of Phase I, reveals a number of significant features:

i) Major engineering projects are expected to account for over half the costs and three-quarters of the gains (before allowing for overhead) in net national income.

ii) Lake fertilization, while absorbing less than 10 percent of the government costs, is expected to account for almost all the remaining contribution to the national income. And it is expected to yield by far the greatest economic return per dollar expended.

iii) Minor projects (small-scale engineering projects, small stream improvement projects and pilot projects) appear to be considerably less attractive than most other types of projects from an income generating point of view.

iv) Community development projects almost break even in terms of benefits and costs, and economically are expected to be as good as, if not better than, minor projects as a means of producing fish. This is significant in view of the objectives other than fish production to which much of the funds expended in this category are directed. For example, almost half of the government resources committed to these projects are absorbed by a complementary training program.

These preliminary expectations and results have important implications for designing future enhancement plans.

Public participation and education As already mentioned, the program was intended to generate a high level of public participation in both planning and implementation, and to make a significant contribution to public education. The degree of public participation is reflected in the more than 7,000 volunteers who have worked on enhancement projects. Numerous meetings with interested public and fishing groups have been held, including two extensive rounds of public consultations, and significant expenditures have been made on information and education. The educator's package, "Salmonids in the Classroom," produced by the Salmonid Enhancement Program became the first federally sponsored education package to be accepted by British Columbia's Ministry of Education.

Other achievements The most easily measured achievements are those relating to fish production capacity. But, in addition, much of the research that has been conducted under the auspices of the enhancement program has been of value to a wide range of other Departmental activities. And the attention focused on the manageability of individual stocks and the ways in which they can be harvested more discretely, in addition to aiding in the selection of priorities for enhancement, is widely beneficial in upgrading stock management generally.

Evaluation of the indirect benefits of the enhancement program is difficult, but I am nevertheless convinced that they are significant. Moreover, to the extent that they have stimulated more searching appraisals of other Departmental responsibilities, especially those relating to habitat and fisheries management, these benefits will be lasting.

EMERGING QUESTIONS

The revised expectations for Phase I suggest that its accomplishments in terms of fish production will be very satisfactory in relation to the funds expended. Moreover, the economic returns to the investment promise to be rewarding, though somewhat less rewarding than originally projected. Social objectives and public involvement and education also appear to have been served. But I must emphasize that these are only expectations at this point.

> The bulk of the benefits accruing from SEP activities are directly related to fish production which, due to the nature of the resource, will be long term and at this time can only be estimated based on expected production and related impacts.[9]

The first returns of adult salmon from the earliest projects are only now beginning to appear, and they will have to be observed over a number of years before the success of the projects is known. Even then the returning adults may not accurately reflect the program's true productivity in view of the complications that have begun to emerge. Here I review the most serious of the questions raised. Most of these issues cannot be resolved with the information at hand, and consequently, evaluation of the Phase I projects must remain incomplete.

Questions will always arise as to how much effort should be devoted to research and evaluation in a major undertaking such as the enhancement program. In the case of Phase I, thorough project evaluation is particularly important because the directions to be taken in the future depend critically on its results. Unfortunately, the groundwork for gathering much of the information necessary for comprehensive project evaluation (particularly assessments of stock interactions) has not been laid, and project evaluation may, as a result, be both difficult and uncertain.

Stock interactions Probably the most widespread concern is whether artificially enhanced stocks will result in the destruction of natural stocks, frustrating the apparent gains by simply replacing wild stocks with enhanced stocks. Stock interaction problems are not unique to enhancement efforts; they occur also among wild stocks. As explained in Chapter 2, the less productive stocks in a mixed fishery may be depleted before the maximum sustainable yield is reached, and this is believed to have happened with numerous small stocks in the commercial fishery.

The concern with enhancement is that it may aggravate and multiply such problems. The large, artificial enhancement projects, especially hatcheries, can be so successful that the stocks are sometimes increased by hundreds of thousands of fish. And the productivity of spawners is so high that only a small fraction of the stock is required for spawning. Problems arise when these enhanced stocks mingle with wild stocks as they are being fished. To oversimplify a complicated biological problem, the fraction of wild stocks that must be left to provide adequate escapement is often several times greater than that required for hatchery stocks. In such mixed fisheries when all of the fish that the enhanced stocks can support are harvested, the natural stocks are overharvested and thereby depleted. So for natural stocks, the pressure of overfishing (discussed in Chapter 2) is aggravated. Additionally, recent studies indicate that competition and predation occurs among salmon species, so that an increase in one species may result in a decrease in another, quite independently of fishing pressure. The federal-provincial Salmonid Enhancement Agreement apparently foresaw threats of this nature:

> . . .enhancement of one stock could result in a detrimental effect on other natural stocks as a result of the increased fishing effort for the enhanced stock.[10]

Program planning attempts to take account of stock interaction in screening candidate projects. Geographic

Working Groups consisting of federal and provincial senior management biologists, district supervisors, and a habitat protection division representative, have been established for three areas: north coast, south coast and Fraser River. These groups assess whether production from specific enhancement projects can be effectively managed without adverse impacts on the other stocks, and recommend changes to the projects as appropriate. The biological planning unit of the Salmonid Enhancement Program works closely with the Geographic Working Groups to try to resolve manageability problems. The stocks to be enhanced are expected to be manageable as discrete units at the anticipated levels of production.

Despite the planning efforts, many believe that potential stock interaction problems are understated. Whether this is the case cannot be determined at present as the first adults from the Phase I program are just now entering the fisheries.

Experience elsewhere has been mixed in this regard. In Japan a major hatchery program has been deliberately pursued at the expense of limited wild stocks. We could pursue that course, but I have no hesitation in concluding that we should not since we have a much richer endowment of natural stocks and opportunities for developing them. Instead we need a system that will complement the management and development of our natural or wild stocks. Other jurisdictions have attempted to do this, but with inconsistent success. In Oregon, stocks have declined following what was an apparently successful hatchery program. Some fear that wild stocks have been displaced by hatchery-reared ones.

> Most of us agree we have a "coho problem." Generally stated, the problem is that our coho salmon populations have slumped to the level we had almost 20 years ago after an apparently successful hatchery program had increased them to a record high in 1976. There is no simple explanation for, or solution to, the coho production problem.[11]

The cause of this phenomenon is apparently complicated by oceanographic and other changes, and some biologists doubt that a similar outcome is likely in Canada. But other experience is not reassuring. Recent investigations into hatchery production in the State of Washington have revealed a wide range of stock interactions. One study indicates that natural productivity has been directly and adversely affected by hatchery output, causing major production losses.[12]

In Canada, the findings from recent reviews of the Babine Lake Development Project (a pre-enhancement program project completed in the late 1960s) are equally disturbing. This project was designed to take advantage of underutilized rearing capacity for juvenile sockeye in Babine Lake, but the impacts of harvesting the enhanced production on other stocks in the Skeena River system were apparently not considered. The facilities are now operating very successfully with respect to the goals of increased smolt output. But the increased fishing for the enhanced stocks has had significant effects on natural stocks, including other populations of sockeye, chinook and steelhead.[13] Disturbingly, overall salmon harvests seem to have increased very little.

Some have suggested that very strong sockeye runs in 1981 indicate that this project may yet prove successful. But sockeye runs were uniformly strong in 1981, so it is not clear that the strength of the Skeena runs can be attributed to the Babine Project. In any event, the Babine Project was undertaken over a decade ago, and it is doubtful that any project involving a 10-year wait before benefits are realized would be found to be economically viable in a preproject evaluation.

To suggest that we still cannot assess the Babine Project's contribution to production raises serious questions about our ability to evaluate, let alone predict, the benefits of any of our enhancement projects. Similar questions regarding mixed exploitation of natural and enhanced stocks in Barkley Sound have been raised, and while the data do not permit conclusive responses, they are nevertheless disturbing.[14]

We cannot yet judge whether the more recent enhancement projects, which have been planned using criteria different from those of the earlier projects, will add to stock interaction difficulties since information will just begin to come in this year. The question does leave me seriously concerned, however, particularly in view of the present weaknesses in the management of salmon harvests, addressed in Chapter 4. Major improvements will be required to correct these weaknesses, and they will not be effected quickly. I am driven to the conclusion that our ability to produce salmon has outstripped our ability to manage the harvests in a way that will ensure that the benefits of the new production will be realized.

Artificial versus natural enhancement An equally lively controversy surrounds the program's current emphasis on big projects and the production of "artificial" stocks particularly from large-scale hatcheries:

> Today, the key debate within the salmon enhancement field is whether to launch the large scale projects and its attendant artificial stocks or to concentrate on massive comprehensive small scale rehabilitation . . . .[15]

From the beginning, major engineering projects were emphasized, as Table 5-3 indicates. There are several reasons for this. First, large hatcheries and other artificial facilities are very productive. By controlling waterflows and other physical conditions, they can achieve a very high egg-to-fry survival rate and hence a larger production from a given supply of spawners. They thus contribute effectively to the central goal of the enhancement program. In addition, substantial economies of scale can be realized. For example, to build three small hatcheries on different streams, rather than one large one with the same total capacity, requires nearly three times the expenditures for water works, bank protection and trapping facilities for adult fish, as well as additional operating costs. As a result, large artificial facilities are relatively more cost effective.

Table 5-3 Planned and actual allocation of federal funds among program areas[a]

	original plan[b]		expenditures to March 1982		estimates to end of Phase 1	
	millions of dollars	percent	millions of dollars	percent	millions of dollars	percent
major projects[c]	92.4	65.1	52.3	48.9	67.0	44.7
minor projects and community development projects	10.9	7.7	17.3	16.2	26.8	17.9
operation of facilities	8.9	6.3	8.1	7.6	20.2	13.5
reconnaissance and evaluation	21.7	15.3	15.3	14.3	17.2	11.5
public involvement	1.9	1.3	4.0	3.8	5.6	3.7
program direction	6.2	4.3	7.2	6.7	9.7	6.4
research	0	0	2.7	2.5	3.5	2.3
total	142.0	100.0	106.9	100.0	150.0	100.0

[a] Provincial program and Department's contribution to operate preprogram facilities not included.
[b] From financial estimates in the original federal Cabinet approval, 1977.
[c] Includes lake fertilization and pilot production.

Source: Salmonid Enhancement Program.

The pressure to achieve a high economic return is considerable. The concern of the Treasury Board is revealed in the following statement:

> There was a general estimate at our meeting that, on the basis of present overhead, a benefit cost ratio of 1.6:1.0 is probably required before a given project should be undertaken. This is an important point on which to focus the on-going controversies between biologists, engineers and economists in the matter of project selection.[16]

The emphasis on large hatcheries and other major projects is consistent with the present importance of economic considerations in the program's objectives. The alternative is to revise the objectives.

Second, a hatchery is sometimes the only practicable means of enhancing or rehabilitating a stock. This was the case, for example, on the Capilano and Puntledge Rivers, where dams made natural spawning grounds inaccessible.

Third, hatcheries, by producing more young fish from the available spawners provide an alternative when increased escapement to the spawning grounds is difficult to achieve. For example, the spawning habitat for chinook salmon in the Fraser River is capable of supporting considerably larger stocks, but fisheries managers have not achieved the increased escapement needed to use the habitat capacity. In addition, the controlled environment of a hatchery ensures production, whereas in natural streams fluctuating flows and freezing may periodically destroy deposited eggs.

Finally, some suggest that the enhancement program would have had difficulty proceeding on as large a scale and as quickly as it did without considerable emphasis on large engineering projects, particularly since plans for several large projects were already prepared. Initiating many small projects would have taken considerable time because staff would have to have been recruited and trained, and projects investigated and organized. The federal-provincial agreement notes that—

> Development plans for many of these sites have progressed to the stage where they can be implemented now, with reasonable assurance of success, in order to conform with the proposed Program schedule.[17]

Some fear that artificial enhancement will disturb the genetics of fish populations through selection, reducing their diversity and resilience, and increasing their vulnerability to disease and predation. Large-scale fish production works also raise risks of devastating accidents. Thus one expert has recently warned—

> At the present time, hatcheries are demonstrably able to produce pink, chum, coho and chinook salmon (but not sockeye, which are notoriously sensitive) that are ready for seaward migration and that will subsequently

> come back as adults in sufficient numbers to make the operation ostensibly profitable using short term and narrow criteria.
>
> When the evaluation of hatcheries is expanded to consider their impact in the long term on wild stocks most hatchery operations are still highly suspect. In addition to the conscious and unconscious selection of fish of particular kinds with its genetic implications for future generations the release of hatchery fish in large numbers has major ecological impacts on wild fish stocks.[18]

Large-scale projects do not always result in artificial stocks of course. Major fishway projects improve access to natural spawning grounds. However, the most promising have already been built, and the scope for additional projects of this kind is limited.

In any event, testimony at the Commission's public hearings has revealed strong and widespread support for a shift in emphasis toward protection and rehabilitation of wild stocks, and more balanced enhancement by means of more numerous and geographically dispersed projects aimed at stream rehabilitation and improvement.

In addition to the concerns expressed above, many advocate small-scale projects to enhance natural stocks because they lend themselves better to public participation. The involvement of volunteers has already been noted, and spokesmen for commercial and sportfishing groups have indicated that potentially many others would like to participate in enhancement work. Schoolchildren and environmental organizations have also proven that they can be useful as volunteers, and enhancement work by prisoners has been demonstrated to be constructive rehabilitative work. This kind of broad public involvement could make a substantial contribution not only to resource development but also to more sensitive public attitudes toward fish and their environmental requirements.

However, because benefits of this kind of enhancement are not as readily quantifiable as the highly visible production from a hatchery or spawning channel, and because small projects, too, are vulnerable to risks — a sudden freshet, for example, can undo months of rehabilitative work on a stream — some have suggested that smaller projects receive lower priority.

As a result of these concerns about the orientation of the enhancement program, the direction of expenditures has changed considerably from the original pattern. Table 5-3 shows that the allocation to major projects has been significantly reduced and the allocation to minor and community development projects significantly increased.

While both large facilities and small projects likely have a place in a well-designed program, there is no obvious, simple answer as to how they should be balanced. Rather than continue the debate about what is appropriate, it would be more productive to ensure that project evaluations are rigorous and comprehensive, that all benefits and costs are adequately considered, including those that are difficult to quantify, and that appropriate allowances are made for risk. In the long run, the fishery will be best served by selecting those projects that generate the highest excess of benefits over costs regardless of their type. If the criteria for ranking projects are sound, the evaluations are rigorous and comprehensive, and project surveillance ensures that they are based on realistic projections, the result should be the "appropriate" mix of facilities.

Species balance A number of commentators have criticized the distribution of enhancement effort among the salmonid species. Sport fishermen, particularly, have suggested that certain species, especially chinook, coho, steelhead and cutthroat trout, have received short shrift in favour of the more exclusively commercial species. And commercial trollers have complained that the traditional net-caught species have received excessive emphasis.

Table 5-1 compares the initial targets set for each species with the expected production. Apparently, some funds originally intended for chum production were redirected toward producing coho, chinook and sockeye. Chinook production has been given increased priority because of the current depressed state of some major chinook stocks, and current plans involve enhancing almost all Strait of Georgia chinook stocks.

The increase in expectations for sockeye is conspicuous, and is due almost entirely to the lake enrichment projects. Enrichment projects are expected to show very high productivity at very low cost; thus sockeye are now expected to account for 39 percent of the enhanced production in Phase I at less than 10 percent of the total cost. The relatively modest original targets for coho and chinook salmon, and steelhead and cutthroat trout are now expected to be exceeded also. Production of chum and pink salmon is now expected to fall well short of the original targets, however. Of course, the question of how appropriate the original targets were is still open and warrants careful review in future planning, and as circumstances change so will the most advantageous pattern of enhancement.

As noted earlier, the purchasing power of the funds available for enhancement has been eroded by almost half; in this light the currently projected production of all species exceeds expectations by a considerable margin except for chum and pink salmon.

Finally, it appears to me that concerns about the mixture of species may be unwarranted. The appropriate species balance, like the best mixture of facilities, will ultimately be achieved by selecting those projects that generate the highest returns. And increased production of most species creates scope for benefiting all user groups.

Effectiveness of lake fertilization Phase I's expected achievements rest heavily on the results of lake enrichment for sockeye production. Experiments with fertilization on Great Central Lake predate the enhancement program; the strong returns in 1976 came at a time when the program was being developed and resulted in lake enrichment being expanded and included in the plans. Early results produced high expectations, and accordingly the planned sockeye production using this technique has been revised upward significantly. This year a sharp increase in the sockeye returns to Hobiton and Long Lakes appears to have rewarded fertilization there.

But high expectations for lake enrichment are not shared by all scientists. Some are concerned that the remarkable returns associated with early experiments may be due, at least in part, to natural ecological phenomena. With the help of biologists I have examined the data relating to the original enrichment projects and am forced to conclude that in some cases the data and historical records are so poor that we cannot reliably assess what has been achieved. This is disturbing because so much now hinges on these projects. The overall success of Phase I depends crucially on a substantial contribution from lake fertilization, as indicated in Table 5-2. In view of the major role that lake fertilization now plays in the program, its effectiveness warrants careful monitoring and evaluation.

Enhancement of stocks subject to foreign interception As a matter of policy, enhancement on streams that produce stocks subjected to significant harvesting by foreign fleets has been deferred in Phase I. This includes the Nass and Skeena Rivers; streams that run through the Alaskan panhandle, which produce fish exploited partly by Alaskan fishermen; and sockeye and pink salmon on the Fraser system, where catches are divided between Canada and the United States by international agreement. Some of these rivers offer excellent opportunities for enhancement, and the delay in taking advantage of them has been vigorously criticized by some participants.

The Fraser River has more potential for enhancement than any other river on Canada's Pacific coast and offers especially attractive opportunities for enhancing pink and sockeye stocks. The International Pacific Salmon Fisheries Commission estimated in 1972 that sockeye catches could be increased by 36.6 million pounds and odd-year pinks by 24.5 million pounds,[19] with many projects showing high benefits in relation to costs. A recent study confirms these estimates.[20]

Under present arrangements, which would assign a substantial part of any increased production of Fraser River sockeye and pink salmon to the United States, pursuing these opportunities would be unwise, since Canada's ultimate position would be weakened by entrenching United States claims. However, a wide range of issues relating to interception of stocks and shared harvests will likely be resolved in the near future through a framework agreement between Canada and the United States.[21] In the event that this allows Canada to realize the full benefits from increased salmon production in the Fraser system, the available opportunities should be vigorously pursued, and careful evaluation will almost certainly indicate that they warrant high priority.

Project economics and evaluation Concerns have been expressed also about the economic performance of the Salmonid Enhancement Program. Some of these concerns flow from those already discussed, in particular, whether the end result is simply to replace wild stocks with costly enhanced stocks in which case an economic loss rather than gain will be realized. The preproject evaluations have assumed that the harvests can be taken from discrete stocks without unmanageable stock interaction problems, but whether this will be achieved remains to be seen. For obvious reasons this assumption must be critically examined and the projected benefits adjusted as the Phase I results come in. But the project analysts cannot be faulted for proceeding on this assumption. The economic evaluations have been thorough within the prescribed assumptions. Indeed, I know of few other federal investment projects which are subjected to such rigorous examination.

Several other important assumptions are embedded in the analyses. One is that salmon prices will increase more than the inflation rate. In view of recent trends in supply and demand for salmon this assumption appears to me to be tenuous. But the assumed rate of increase is modest, and does not raise the estimated benefits substantially.

More serious is the assumption that the federal and provincial governments will curb wasteful expansion of capacity in fishing and processing. The joint federal-provincial agreement that provides the framework for the enhancement program perceptively provides that the two governments will "restrain the primary and secondary sectors of the commercial fishing industry from incurring unnecessary capital investments which could dissipate the benefits to be generated by the Program."[22] They further agreed to develop and implement a plan to "restrain unwarranted investments" by January 1980.

The economic evaluations of the projects in Phase I were based on the assumption that redundant investment in the fleet would be controlled so that capital costs would not increase. As explained in Chapter 9, however, the federal government has clearly failed to prevent investment in excess fishing capacity. The indicated economic benefits of the enhancement program must, therefore, be regarded as only potential, to be realized only if effective means are found to control wasteful investment in fishing capacity.

I view this failure to control investment as the most direct threat to the program's economic success. I have already expressed my conclusion that our ability to enhance fish stocks has outstripped our ability to manage the harvests so as to realize the full benefits of that enhancement. But even if our ability to harvest the stocks more discretely is developed, the enhanced production will be wasted if the potential benefits are dissipated by costly investment in redundant fishing capacity. The same concern about the enhancement program has been expressed in a recent study undertaken for the Economic Council of Canada:

> These potential benefits will be realized, in the words of the Program's information branch "... assuming that additional capital inputs will be disciplined" ... it is doubtful that the present regulations in the fishery can achieve this discipline .... This being so, there is fear that the net benefits of the Program to society will be negative.[23]

The danger is also recognized by fishermen who support the enhancement effort:

> ... an increase of total fish stocks without other restrictions (on the fleet) will only postpone the problem and result again in dissipation of the resource into further investment.[24]

The threat that the program will yield a negative net benefit indicates the urgency of controlling the capacity of the fishing fleet.

Thus, my anxiety about resource enhancement converges with my concern for an effective policy for regulating commercial fisheries. A licensing and fleet development policy that will reverse past trends and reconcile fishing capacity with the available resources, desirable in itself, is also a condition for the success of enhancement efforts.

In Chapter 9 I propose a fleet rationalization policy that would pave the way for beneficial enhancement. Without it, or some effective alternative, enhancement as an economic development program is bound to fail.

The "enhancement-through-management" alternative The economics of enhancement are not independent of the opportunities for producing the fish in other ways. A basic tenet in economics is that project output cannot be valued more highly than the cost of producing it by the least cost alternative means. The enhancement program evaluations have implicitly assumed that active enhancement is the only means by which increased production will be achieved. But in many areas salmon production has been increased, not by new enhancement facilities, but through careful management of harvests and escapements. The International Pacific Salmon Fisheries Commission has rebuilt sockeye and pink stocks in the Fraser River in part through stock management.[25] In the early 1960s, increased escapements through restrictions on the commercial catch were apparently successful in bringing about a recovery of chum stocks in southern British Columbia.[26] And, as I have noted in Chapter 2, the sockeye and pink salmon stocks have increased remarkably in Alaska following restrictions on the commercial harvests. Participants at the Commission's hearings have urged that a similar approach be taken to accelerate stock restoration here:

> Fulfilling the commitment to the fish means sacrifices by all user groups. Fish populations must be built up. Enhancement and good management practices will help. However, the only effective way to quickly rebuild the fish population is to dramatically increase the supply of fish on the spawning grounds.[27]

Recently the enhancement staff have considered enhancement through management as a means of increased salmon production. In 1979 they assessed the status of Rivers Inlet sockeye and determined that the spawning and rearing habitats could support considerably larger stocks. Subsequently, their economic analyses indicated that the values foregone by reducing harvests in the short run would be more than compensated for by the resulting increases in catches in the long run. Indeed, the analyses indicated that the sacrifice in catches in the short term may yield a very high return (by the enhancement program's benefit-cost criteria). The Department has since proceeded with an experimental enhancement-through-management program for Rivers Inlet sockeye, which appears promising.

While the measures taken in Rivers Inlet cannot be applied coastwide, the approach has much to recommend it. Indeed, the basic principle of managing the fisheries to produce maximum yields applies generally. In this single case where the analysis has been done, the rehabilitation of stocks through greater escapement appears very cost effective. It also puts the bulk of the costs (in terms of foregone catches) on the beneficiaries. And I have no hesitation in asserting that this kind of natural rehabilitation should be preferred over artificial enhancement on grounds of biological vigour of the stocks, resilience and low risk.

I cannot say, given available information, whether the production targets for Phase I of the program could be achieved at less cost by enhancement through management, but it seems to me that this alternative deserved a good deal more analysis than it received. However, the funds for Phase I are now effectively committed, and it is perhaps pointless to even speculate on what might have been. But certainly management alternatives should be given much more consideration in planning future enhancement. All this points to the need to integrate enhancement, fishery management and habitat protection, which I will turn to below.

PLANNING FOR THE FUTURE

I have reviewed the accomplishments of the enhancement program and the concerns about it in some detail because I believe we must take these matters carefully into consideration in designing future policy in this matter. Phase I is a bold experiment in resource development. Moreover, it has been well organized. Particularly impressive is the thoroughness of project planning, the scope of the benefits considered and the rigor of project evaluations. The scrutiny these projects have received from program planners and boards is probably unsurpassed in governmental planning of major expenditures.

The end of Phase I is now fast approaching, and decisions must be made for the future. The federal and provincial governments prudently agreed at the beginning that future undertakings would hinge on the results of the Phase I experiment. So we must take stock of what has been accomplished, weigh carefully what has been learned, and plan accordingly.

According to current expectations, the program will result in an enhanced production of fish that must be judged satisfactory in terms of the original targets and the funds expended. The Department seems confident that these expectations will be realized.[28] The Salmonid Enhancement Board has also indicated its confidence by recommending in its 1979/80 report to the two Ministers, that planning should proceed for the next phase, and the federal Cabinet recently allocated $4.5 million for this purpose. The board reconfirmed its belief that salmon catches could be increased through enhancement by 150 million pounds annually, and suggested that the second phase should aim at completing projects, over a 10-year period, capable of increasing production by 100 million pounds. I understand that the board, on the advice of staff, has recently amended this objective to 50 million pounds of increased annual production over a 5-year period. Cost estimates are not yet available, but this program is expected to cost much more than 150 million in 1982 dollars. In addition to these official endorsements, the enhancement program enjoys considerable support from the fishing community and the wider public.

Nevertheless, the proof of an experiment is in its results. In this case the results are not yet manifest and are fraught with uncertainty. I must emphasize that the program will be successful only if, among other things, the current expectations about increased returns are realized; the mixed fishing problem can be solved to protect wild stocks; lake fertilization proves itself; fleet expansion can be controlled; and it can be demonstrated that equivalent benefits cannot be obtained simply by better fisheries management. At present, we simply do not have the evidence to be assured that any of these conditions will be met. I am therefore compelled to advise the government to be cautious, to address itself to the obstacles to successful enhancement, and to carefully evaluate results.

My terms of reference require me to make recommendations to ensure that the public interest is protected in provisions for resource management and enhancement, among other things. My proposals relating to future enhancement plans are made with reference to this instruction, and the current uncertainties surrounding the results of the program so far.

Short-Term Plans

Plans for the immediate future must consider the substantial staff of specialized personnel the Department has built up for the enhancement effort, and the cohesiveness they have developed. Any serious interruptions of the enhancement program would result in losing this capability and momentum, which would be costly for any renewed effort. So while I advocate a cautious approach to the next phase, I also propose urgent attention to evaluating existing projects so that the appropriate direction and dimensions of future activities can be clarified as quickly as possible.

I therefore recommend that—

1. **The Salmonid Enhancement Program should proceed with planned projects for the remainder of Phase I, according to its established priorities.**

2. **A concerted effort should be devoted to monitoring and comprehensively evaluating the results of projects already in place. Careful attention should be paid in these evaluations to the implications of enhanced stocks for fisheries management.**

3. **Planning for future enhancement should proceed, with appropriate funding (not out of the Phase I budget), for the next two years as determined with the advice of the Salmonid Enhancement Board.**

Long-Term Planning

At the outset of the program the Department committed itself to "an adaptive planning process"[29] that would respond to accumulating knowledge and opportunities; to learn by doing. This is a prudent approach to take in the initial experimental phase of the program. Henceforth, the emphasis should be on learning from the results of those projects. This means monitoring and evaluating, setting priorities with reference to current knowledge, postponing more projects, especially major projects, of a kind that have yet to prove themselves, and giving lower priority to those that have shown mixed success. I therefore recommend that—

4. **Priorities for future enhancement should be linked to the emerging results of the Phase I projects as revealed by careful monitoring and evaluation. Major projects of a kind that have yet to prove themselves, raise problems of mixed fishing and manageability, or depend on uncertain information should be postponed until these questions are resolved. Correspondingly higher priority should be accorded to well proven techniques, smaller and less risky projects, and works based on relatively solid information.**

Evaluation of potential projects should include assessing whether equivalent results could be achieved through improved management of fishing and escapements. Artificial enhancement should never be a palliative for poor management of existing stocks. The scope for rebuilding stocks through increased escapements, described in Chapter 2, leaves me with some concern that the organizational separation of the enhancement and fisheries management units in the Department may have impeded routine consideration of the management alternatives to artificial enhancement works. Accordingly, I recommend—

5. **Artificial enhancement projects should be approved only if investigation reveals that equivalent net gains cannot be achieved through improving fisheries management or reducing fishing pressure.**

Future planning for enhancement and fisheries management must address the general problem of mixed fisheries, explained earlier in this chapter. If this problem cannot be resolved, major enhancement projects will lead to the demise of wild stocks, and otherwise promising opportunities for large-scale artificial fish production will have to be foregone.

Biologists working within the enhancement program and at the University of British Columbia have proposed an innovative scheme for managing enhanced stocks in such a way that, instead of posing a threat to wild stocks in mixed fisheries, they will assist in rehabilitating them. The scheme involves adding large numbers of enhanced fish to a mixed fishery where wild stocks are depleted while holding the total catch fixed. This reduces the rate of exploitation of the wild stocks and allows them to rebuild through increased escapements. The surplus enhanced fish would then be harvested in a terminal fishery. This plan neatly combines opportunities for enhancement with improved management of natural stocks. It underlies the planning for the Kitimat hatchery, which will begin operation this fall, and clearly warrants careful examination both as a general solution to the mixed fishing problem and as a feasible component in plans for new enhancement facilities.

Finally, in setting priorities for future enhancement, the vast opportunities in the Fraser and other rivers that have so far been set aside because of the unresolved problem of foreign interceptions must be considered. Undoubtedly, some of the best opportunities for enhancement are in the Fraser River system. But, as I explained earlier, enhancement should not be undertaken until international arrangements are settled. However, negotiations are proceeding; an agreement is likely to be reached soon; and, since these projects take considerable time to identify and plan, the investigations should be made now, in order to be in a position to proceed with these projects at the earliest opportunity. Accordingly—

6. **Investigations of enhancement opportunities should include those in rivers that support stocks subject to foreign interception, especially sockeye and pink salmon stocks in the Fraser River system, so that the best projects can proceed as soon as international agreement is reached on interceptions.**

A Renewed Intergovernmental Agreement

The existing federal-provincial enhancement agreement expires in 1984, but it includes provisions for a renewed agreement depending upon the experience of Phase I. Whatever the best form and composition of enhancement efforts in the future, they will be best served by a formal agreement of this kind that will knit together the overlapping jurisdictional responsibilities of the two governments and commit them to cooperative arrangements. Such formal agreements take some considerable time to negotiate. I therefore recommend—

7. **The government should immediately approach the Government of British Columbia with a view toward negotiating a renewed enhancement agreement.**

The new agreement should provide for the kind of enhancement projects covered by the current agreement. I propose in Chapter 18 that it should become part of a broad contractural framework between the two governments to deal with a variety of their joint interests in fisheries.

In Chapter 3 I proposed a joint program directed toward inventory of the aquatic habitat to enable formulation of long-term objectives and plans for the fisheries and to identify opportunities for fish enhancement. This will complement the planning of future enhancement projects, provide groundwork for rehabilitating natural stocks and, at the same time, provide data for more positive responses to other, competing resource demands.

Term Some of the difficulties encountered under Phase I can be attributed to its term: it is a seven-year program; it started abruptly; and after having built up staff and momentum, its expiry is approaching with the possibility of significant dislocation. The new agreement should provide for more stable planning through a series of short-term commitments renewable well before their terms expire. I therefore suggest that—

8. **The new federal-provincial agreement should carry a term of five years, with provisions for renewal for successive five-year terms to be negotiated after three years.**

This will ensure that the program will not terminate with less than two years' notice. It will enable five-year operational and financial planning while providing the governments with opportunities to review their commitments at three-year intervals. Periodic renewals of this kind will also facilitate changes in the size and structure of the program in response to accumulating experience and evaluations of completed projects.

Program Size and Funding

My preceding recommendations imply that a renewed enhancement program beginning in 1984 should involve some reorientation and scaling down for a few years, particularly in respect of large engineering works until their success is demonstrated. These major facilities account for about half the expenditures in Phase I. The new program should be constrained by two considerations: the available funds and the opportunities for projects that can be expected to generate significant benefits in excess of costs.

9. **The renewed enhancement program should provide for undertaking those projects that promise to yield the greatest benefits in excess of costs, based on the demonstrated success of the different forms of enhancement and without invoking risky assumptions about restructuring the fisheries, harvesting patterns and management reforms. Within this general constraint, the program should be limited by the funding currently available for this purpose.**

The cost of enhancement activities under the new agreement should be shared by the two governments, though not necessarily in the same proportions as the present agreement. And, as in the present agreement, provisions should be made to enable the governments to recover their costs. Thus—

10. **The agreement should provide for sharing the costs of the program between the two governments in proportions that should be newly negotiated. It should enable both governments to recover their expenditures under the agreement.**

While the Department, under its regular budget, operates hatcheries and other enhancement works, the facilities constructed under Phase I continue to be managed by the enhancement program staff and budget. The operating costs have been growing significantly and, with the extension of the program by two years, they impose a heavy burden on enhancement funds. By the end of Phase I, some $20 million is expected to be absorbed in operating projects completed under the program.

In general, the continuing operating costs of completed enhancement works should not encroach on the budget available for new projects; completed projects should be funded through the Department's regular budget and integrated with general fisheries management plans. Accordingly—

11. **The operating cost of all completed enhancement facilities should be provided through the Department's regular operating budget at the end of Phase I, and thereafter the cost of operating new projects should be transferred as they are completed.**

Cost Recovery

The federal government's position on recovering the costs of enhancement has been somewhat equivocal. In 1977 the Cabinet approved a plan to recoup expenditures on enhancement from sport fishermen and the fishing industry. New charges were to be levied on fishermen, beginning the following year sufficient to recover not less than 85 percent of the planned expenditures. The remainder, up to 15 percent (some $22 million) was considered not recoverable because of the program's social goals.[30] But the first steps were not taken until 1981 when the new saltwater sportfishing licences were implemented and commercial licence fees were increased. In announcing these measures in late 1980 the Minister also stated his intention—

> ... to move forward with all administrative arrangements and enabling legislation for the third component of this plan, commercial salmon landings charges, to be ready for implementation in 1982.[31]

No charges on commercial landings have yet been levied. Saltwater sportfishing licence fees yielded $1.68 million in 1981, half of which was absorbed in related administrative costs. The increase in commercial salmon licence fees yielded about $1.0 million. Meanwhile, the expenditures intended to be recovered have been mounting, and accumulating at compound interest. They stood at $115 million in March of this year, increasing at 10 percent plus new expenditures. So no determined effort to recover costs has been made, notwithstanding the Cabinet's decision.

The public hearings have revealed a diversity of opinion about recovery of enhancement costs. Some question the justification for such a policy. They point out that fisheries agencies throughout the continent build and operate hatcheries or other works to increase fish production without these activities being constrained by the revenues collected from fishermen. Many argue that, where habitat rehabilitation is required, those who have damaged the habitat should bear most or all of the cost. Others have suggested that fishermen should not be required to contribute until the increase in fish supply is available to them. And much controversy surrounds how charges should be levied. Nevertheless, many sport and commercial fishermen support the principle that those who will benefit directly from resource enhancement should contribute to the cost. However, because federal cost recovery measures have been so long delayed, enthusiasm for contributing to the cost of Phase I, has diminished since most of the funds have already been mostly expended, and in a way that cannot now be influenced.

It would be pointless to attribute future revenues to Phase I costs or any other specific past expenditures. The money is spent, the works are in place and the government has failed, so far, to meet its own fiscal commitments. Now we must decide for the future.

The focus should be, first, on designing a new enhancement plan that will generate the maximum benefits in excess of the costs; and second, on recovering costs from those who will benefit from the enhanced resources. But not all projects that yield net returns lend themselves to financial arrangements for capturing enough of the benefits to pay for the projects, and some of the benefits sought through enhancement are broadly social rather than narrowly economic.

I therefore propose that the federal government's financial provisions for enhancement beyond Phase I be linked directly to the revenues from resource users and to a federal contribution of an amount at least equal to the nonrecoverable expenditures under Phase I. Therefore—

12. The federal government should write off its unrecovered enhancement costs under Phase I of the program. Providing that suitable projects are available, the federal government should provide funds for enhancement during the first term of the renewed agreement not less than the sum of—

i) half the revenues from saltwater sportfishing licence fees (expected to be initially about $2.0 million),

ii) half the revenues from royalties on commercial salmon landings (initially about $6 million),

iii) revenues from sales of fish and eggs at enhancement facilities (now about $0.6 million),

iv) an amount equal to the expenditures under the present program that are not intended to be cost recoverable (about $3.2 million on an annual basis).

The unrecoverable contribution should probably be higher than the average of $3.2 million per year provided for under Phase I, since I suggest no reduction in the kinds of activities that generate most of the social benefits considered to be not cost recoverable (such as community development and public participation projects, minor projects and fish provided to Indians from enhancement facilities). Moreover that figure was established in 1977 and by 1984 will be significantly eroded by inflation. In addition, by 1984 and increasingly thereafter the three revenue sources will yield more than the present estimates, and the unrecoverable contribution should at least maintain its relationship — about one-third — to total spending. The federal government's commitments under the new agreement should be based on reasonable estimates of future revenues.

This suggests an enhancement program during the first term of the new agreement beginning at an annual level of at least $12 million plus the provincial contribution. With the Department assuming the operating costs of completed projects, and the addition of the aquatic inventory program, the total level of activities under both programs may not fall significantly short of the current enhancement effort.

Elsewhere in this report I explain that the economic returns to the fishery can be substantially increased through improved fisheries management and rationalized commercial fleets. If the measures proposed are taken, they will increase revenues for enhancement purposes as well. But in view of past experience the federal Treasury Board ought not to approve expenditures of funds intended to be recovered beyond Phase I until the machinery for recovering them is firmly in place.

Organization

Participants in the Commission's hearings criticized the present organization of the enhancement program on several grounds: its separation from the Department's habitat and management arms, the structure of the board and the Salmonid Enhancement Task Group, the scope of their terms of reference and (especially) the relationship between these two groups. In effect, one advisory group (to the board) advises another advisory group (to the Ministers); each is concerned with important and worthwhile issues, but their lines of responsibility are awkward, causing some strain.

To begin with, the program needs a special organizational structure for several reasons. One is that it is funded separately by two governments and is accountable to two Ministers. A second is that the nature of its activities calls for different planning periods from most Departmental functions. A third and related reason is that it is mission-oriented toward a special set of purposes. The success of the program in working single-mindedly and effectively toward its goals can undoubtedly be attributed in large part to its separate budgeting and staffing arrangements. So, I conclude that the present separate provisions for the enhancement program should be maintained in the new agreement. I should add that I nevertheless see a need for closer integration of enhancement planning with habitat and fisheries management, as I explain elsewhere. But this does not require merging the enhancement organization with the rest of the Department. Given the turmoil in the Department's organization in recent years (described in Chapter 19), an additional restructuring would, for the time being, be disruptive and damaging to morale. In Chapter 19 I suggest that for the longer term these structural relationships be reviewed in the broader context of the Department's administrative organization.

With its distinct mandate, budgets and staff, and dual accountability, the program clearly needs a high-level board, like the present Salmonid Enhancement Board, to advise the two Ministers on the program's direction and on how budgets should be allocated. The present board appears to be well structured (with appropriate representation of governments and nongovernmental interests) and efficient, so I propose no organizational changes.

13. At least under the first term of the new agreement, the separate organizational structure for the enhancement and aquatic inventory program should be maintained, as should the present structure of the enhancement board.

Changes are called for with respect to the task group, however. I propose that it be replaced with a regionally based public representative organization, with terms of reference broadened to embrace habitat matters as well as enhancement. The structure and organization of these regional Fisheries Conservation Committees are described in Chapter 17.

Concluding Note

The Salmonid Enhancement Program is both exciting and challenging. Phase I has been well planned and efficiently carried out, and the funds have been spent carefully. Present information provides grounds for hope that the returns will be satisfactory.

But these are only expectations; the evidence of success of the experiment is not yet in, and experience in Canada and elsewhere indicates that predictions are fraught with uncertainties. The message I want to convey in this chapter is one of caution. The program should be renewed with a modified mandate. But we should not proceed with additional major works with uncertain results until we have more tangible evidence of the success of those already built. And we must begin to face up to the obstacles to the program's success that I have identified here, especially the threat to natural stocks under present fishing patterns and the threat of dissipating the gains in further expansion of redundant fishing capacity.

FOOTNOTES

1. Sport Fishing Institute of British Columbia, Exhibit #97, p. 41.
2. For a historical commentary, see A.W.H. Needler, Evolution of Canadian fisheries management towards economic rationalization, Journal of the Fisheries Research Board of Canada, Volume 36 No. 7, 1979. pp. 716-724.
3. Government-Industry Policy Development Seminar on Resource Enhancement. Fisheries and Marine Service, Department of the Environment, Vancouver, 1974.
4. Federal-Provincial Agreement: Salmonid Enhancement Program. Memorandum of Agreement signed by the Minister of Fisheries and Environment for Canada and the Minister of Environment for British Columbia. March 1, 1979.
5. Federal-Provincial Agreement, p. 2.
6. The original targets were set in 1976 dollars and have been converted to 1980 dollars using the Consumer Price Index.
7. Source: Economic Advisor, Salmonid Enhancement Program. These results are not the same as those contained in the Department of Fisheries and Oceans' submission to the Commission because they reflect revisions made since that submission was prepared.
8. Also, some resources may have been diverted towards projects in the target area to obtain a more desirable distribution of benefits, at the expense of projects that were capable of generating more income.
9. Department of Fisheries and Oceans, Exhibit #162, p.17.
10. Federal-Provincial Agreement, Annex "A", p. 3.
11. Comprehensive Plan for Production and Management of Oregon's Anadromous Salmon and Trout, Part II. Coho Salmon Plan. Oregon Department of Fish and Wildlife, Portland, Oregon, October, 1981. p. 1.
12. Jim Ames, Salmon Stock Interactions in Puget Sound: A Preliminary Look. Canadian Technical Report of Fisheries and Aquatic Sciences, forthcoming, 1982.
13. R.K. Kadawaki and A.D. Anderson, The Skeena System, Canadian Technical Report of Fisheries and Aquatic Sciences, forthcoming, 1982.
14. D. Schutz, Barkley Sound Enhancement - A Success Story or Disaster, Canadian Technical Report of Fisheries and Aquatic Sciences, forthcoming, 1982.
15. United Fishermen and Allied Workers' Union, Exhibit #138, p. 0-1.
16. Letter from the Program Analyst of Treasury Board to the Department of Fisheries and Oceans. March 3, 1978, p. 3.
17. Federal-Provincial Agreement, Annex "A", p. 2.
18. P.A. Larkin, "Is it wise to plan to manage salmon populations making a distinction between wild and 'hatchery' stocks?" Unpublished manuscript, 1978. p. 23.
19. Proposed Program for Restoration and Extension of the Sockeye and Pink Salmon Stocks of the Fraser River. International Pacific Salmon Fisheries Commission, New Westminster, 1972.
20. E.H. Vernon, Fraser River Sockeye: The Stocks and Their Enhancement. Department of Fisheries and Oceans, Vancouver, January, 1982.
21. A Draft Framework Agreement Between Canada and the United States for the Management of Pacific Salmon, Background Information. Department of Fisheries and Oceans, Information Bulletin, Vancouver, July 21, 1982.
22. Federal-Provincial Agreement, pp. 7-8.
23. J. Douglas MacDonald, Regulating Pacific Salmon — The Alternatives Reviewed. Economic Council of Canada, Technical Report No. 24, The Public Regulation of Commercial Fisheries in Canada, Ottawa. February, 1982. p. S.47.
24. Pacific Trollers Association, Exhibit #77, p. 24.
25. Vernon, Fraser River Sockeye.
26. Additional Information on the Exploration, Scientific Investigation, and Management of Salmon Stocks on the Pacific Coasts of Canada and the United States in Relation to the Abstention Provisions of the North Pacific Fisheries Convention. International North Pacific Fisheries Commission, Bulletin Number 29, Vancouver, 1974.
27. Ocean Fisheries Limited, Exhibit #64, p. 5.
28. Exhibit #162, p. 19.
29. Exhibit #162, p. 7.
30. Letter from the Program Analyst of Treasury Board to the Department of Fisheries and Oceans, March 3, 1978.
31. Exhibit #162, p. 3.

CHAPTER 6

RESEARCH AND INFORMATION

> *A timetable for accountable scientific research must be established in order that certain objectives are met and that the scientific research does not become an ongoing and self-perpetuating scientific exercise.*
>
> THE CANADIAN FISHING COMPANY LIMITED[1]

This Commission's terms of reference direct me to inquire into "the provisions for conservation, management, protection and development of the fish resources, including the protection of their tidal and nontidal habitat" and "optimum rates of harvesting." These are all issues that imply a significant research requirement. As described in other chapters, research is a basic ingredient of the Department's fisheries management, enhancement, and habitat protection programs. Although a great deal of high quality research has been done in support of these programs, our understanding of the biology of fish and their relationship to their environment remains weak; this is a serious impediment to improved protection and utilization of the resources. Accordingly, I have investigated the Department's provisions for conducting research and gathering information, and my findings are reported in this chapter.

DEVELOPMENT OF THE RESEARCH ORGANIZATION

The rich tradition of fisheries research in Canada can be traced back to 1903 when the federal Commissioner of Fisheries, Dr. E.E. Prince, concluded that Canada should attain a position equal to other countries in marine and freshwater biological research.

The research program on the Pacific coast began in 1908 with the establishment of the Pacific Biological Station at Nanaimo. The early studies, often carried out by volunteers, were largely descriptive. They continued, with meagre financial support, until after the Second World War. At that time a new chairman was appointed to the Fisheries Research Board, which had been created around the turn of the century. During his tenure, both basic and applied research were strongly supported, and many current fisheries management concepts were developed.

The appointment of a new chairman in the mid 1960s was accompanied by a shift in emphasis. Higher priority was assigned to basic or experimental research than to descriptive studies in order to enhance Canada's reputation in fisheries science. This effort was successful, and the fisheries research conducted by Canadian scientists, already highly regarded, achieved even higher international stature. As a consequence, however, scientists of the Fisheries Research Board in Nanaimo received little support for analyzing the fish stocks of the region and maintaining long-term data bases.

In retrospect, this change in emphasis was unfortunately timed, since such information was urgently needed to deal with compounding management problems. The Department's ability to protect and manage the resources was threatened by burgeoning fishing fleets; the herring fishery collapsed in the late 1960s; Canadian and U.S. interceptions of each others' salmon stocks expanded; new fisheries were developing; and foreign fishing just outside Canadian territorial waters suddenly increased, decimating groundfish stocks important to Canadian fishermen.

Since the Fisheries Research Board was, unfortunately, turning away from active acquisition of the information necessary to deal with these problems, the Department's administrative office in Vancouver had little alternative but to hire its own technical support staff. It therefore recruited a group of biologists in Vancouver to provide data urgently required to regulate the fisheries. With certain notable exceptions, the Fisheries Research Board scientists became increasingly isolated from the practical problems of the Department, lost their interface with the industry and, consequently, were asked for advice less and less frequently.

Thus, two competing organizations provided knowledge and information for fisheries management. In hindsight, the results were predictable: decline in the quality of advice for management; competition for finances and personnel; and strain among researchers. In times of austerity, since immediate and often desperate needs of day-to-day management had to be met, support for the group doing less "relevant" research was cut.

Other disruptive forces have also been at work. The last 15 years have been a time of organizational turmoil: successive waves of federal government austerity have been interspersed with occasional infusions of funds; new government policies favoured contracting out research rather than developing in-house capabilities; and the Fisheries Research Board was disbanded during the 1970s and its staff amalgamated with the Department's, apparently in the hope that they would devote more effort to investigations directly related to the Department's management needs.

> These changes adversely affected the capability to respond at a time when some of the most profound developments in the history of the fishery were occurring, e.g.: the establishment of a 200 mile limit, the development of a salmonid enhancement program; rapid development of a multi-million dollar roe herring fishery; the explosive increase of the catching capability of the commercial fishing fleet (as well as in recreational fishing interest and participation); and the increased public awareness of the sensitivity of fish habitat, all aggravated by expanding population and industrial development.[2]

The Department's current manpower and budget devoted to research are summarized in Table 6-1. These provisions are substantial, amounting to 358 person-years and $19 million annually. This reflects the crucial importance of research in the fisheries; few regulatory agencies need to depend so heavily on research scientists for guidance in conducting their on-going management activities. In addition to the Department's internal work, it sponsors some outside research. Other fisheries research is conducted in the region by international commissions, the government of British Columbia and universities.

Table 6-1 The Department's research commitments, 1981-82

branch	manpower	operating costs including salaries
		($ millions)
Resource Service[a]	224	10.4
Field Services[b]	78	3.8
Technology Services	21	.9
Salmonid Enhancement[c]	35	3.8
	358	18.9

[a] Includes direct support costs such as laboratory operations and research vessel operations provided by Support Services Branch.

[b] Includes habitat bio-engineering studies, scientific and technical advice, and data analysis and interpretation.

[c] Includes fish culture research, manageability studies, hatchery operational studies and lake enrichment. Lake enrichment is included as research but is also a fish-production activity, and approximately $1 million of this total can be attributed to production.

Source: Department of Fisheries and Oceans, Exhibit #182, p. 16.

At present the Department's research activities are scattered among the various branches within the Pacific region with little coordination. The Resource Services Branch (recently renamed the Fisheries Research Branch) conducts 50 to 60 percent of the research in the region and is responsible for a broad range of applied and basic research and resource assessment. This includes studies of salmon habitat; fish populations and ecology; lake enrichment; fish culture and health; and studies dealing with various aspects of groundfish, shellfish and herring. The work of this branch is carried out at two major research laboratories, the Pacific Biological Station at Nanaimo and the West Vancouver Laboratory. The Technology Services Branch conducts applied research aimed at improving the quality of fish catches and products. The Field Services Branch, which manages fisheries and fish habitat, conducts applied research and activities such as stock assessment and monitoring. And, to develop techniques and evaluate and improve operations, research is also conducted under the Salmonid Enhancement Program. Superimposed on these regional functions, the Ottawa-based Fisheries Research Branch advises on programs and policies, and the integration of fisheries science with other elements of management.

These scattered responsibilities for investigative activities have left many researchers preoccupied with organizational rather than research concerns. It has also become extremely difficult for officers within the Department to identify which unit to approach to obtain information required to meet particular management needs. In addition, some studies that both managers and researchers agree should be done are not undertaken. Successive interbranch committees and working groups have attempted to bridge these gaps, but with mixed success. This lack of cohesion between investigators and managers, and shortages of information in a number of key fields have drawn frequent comment from many sectors of the fisheries.

> Everywhere the fisheries are in trouble.... Where is the science? The industry requires certain answers that are not available from the researchers. Simple things like the expected long-term supply of fish.... None of the biological research can provide this....[3]

In short, a breakdown has occurred in the Department's ability to frame the questions that need to be answered as background for management, enhancement and habitat protection; to deploy its forces effectively to obtain the required knowledge; and to present the results of such investigations in a clear and understandable manner. While researchers and managers have sometimes worked well together, such occasions have been rare, and major improvements are needed. The Department recognizes this:

> ...these developments...highlighted the necessity of achieving effective team work among research scientists, biologists and managers without regard for past work divisions or work locations. Concerted effort has therefore been made in the past few years to work toward totally integrated Fisheries Management.[4]

In the remainder of this chapter I suggest approaches to resolving the most conspicuous deficiencies.

REDIRECTING RESEARCH PRIORITIES

Confusion about the objectives and responsibilities of investigative staff dispersed throughout the Department has led to rather arid debates about functional responsibilities and whether "pure" or "applied" research should be emphasized.

In determining the priorities for the Department's research effort we must recognize that other organizations are involved in fisheries and ocean science research and that each has its unique competence and responsibility. These organizations include international commissions, universities and foreign bodies. What distinguishes the Department from most of these other organizations is that it is responsible for managing the fisheries. Thus, whatever the needs for pure or applied research, the Department should be guided by the requirements for effective resource management. Therefore, my first recommendation is —

1. **The Department's research priorities should be determined by the requirements for effective management and conservation of Pacific fish resources and their habitats.**

My proposals in the remainder of this chapter are designed to reorient the Department's research effort in this direction.

I have already pointed to particular information needs relating to salmon habitat (Chapter 3), the condition of the fish stocks (Chapter 2 and later in Chapter 15) and the Salmonid Enhancement Program (Chapter 5), which is a scientific experiment itself. In this chapter I am concerned with general requirements for fisheries management and conservation.

Investigative activities required for protecting, managing and enhancing the fish resources may be roughly divided into three categories: first, monitoring to provide consistent and accurate information about the stocks; second, short-term, problem-solving research; and third, longer-term investigations to provide the basis for future development. I deal with each of these in turn.

Monitoring and Assessing Stocks

The management of our major fisheries is based on assumed relationships between the number of spawning adults and their progeny available for harvest in later years, and on the relationships between growth and mortality. These relationships are fundamental; they guide the determination of catch and escapement targets for each stock and the design of fishing plans. So it is crucial that they are well understood, tested, confirmed and refined so that management can proceed with reasonable confidence.

But a good deal of uncertainty surrounds these basic dynamics governing the productivity of some of our major species. Scientists differ in their judgements, and the available information is not sufficient to resolve their differences.

Thus, the most urgent requirement for fisheries management is clarification of the basic biological relationships between stock abundance, catches and escapements. This involves research using reliable data on the stocks being managed. The required data vary, but for our major species, in particular salmon and herring, the essential data are statistics on catches and escapements and information on the composition of the catches. Other information is sometimes used to assess stocks, some of which I refer to in Chapter 4.

Catch statistics The basic source of the Department's information on commercial catches are sales slips that record landings. These appear to provide satisfactory data for certain species, such as herring, groundfish and certain shellfish. But for others, notably salmon, sales slip data are seriously deficient and appear to have deteriorated in recent years. They do not provide adequate information about where catches were taken; they do not include many direct sales to consumers; and they may contain false information. The inadequacy of data on Indian and sport catches is explained in Chapters 14 and 15.

In later chapters of this report, I recommend steps to improve statistical information on landings, in part through cooperative arrangements with the government of British Columbia.

Fishermen's logbooks are another source of catch data. Halibut fishermen have for many years been required to submit logbooks of their catches to the International Pacific Halibut Commission, and the Department has established a comprehensive logbook system for groundfish and abalone fishermen as well. A voluntary logbook program is now in place for the salmon troll fleet.

The kind of detailed information provided by logbooks can be extremely valuable for resource management purposes. Mandatory logbook programs should be imposed with discretion, however: they impose a burden on fishermen; they may not generate as accurate information as voluntary arrangements; and, for large fisheries, they may generate more data than is needed. The most urgent need appears to be an expanded voluntary logbook program for the salmon troll fleet capable of providing adequate and representative sample of catch information.

Creel surveys, and information obtained from licence sales and punchcards provide means of obtaining statistics on catches in the sport fishery. I make recommendations on these matters in Chapter 15; and in Chapter 14 I propose means of improving information about catches in the Indian fishery.

Complete and accurate catch information is essential, not only for fisheries management, but also for administering the royalties and quotas I propose in later chapters.

To bring about the necessary improvements, I recommend —

2. **The Department should immediately take steps to improve the quality and completeness of statistical information on catches by —**
   - **i) Adopting modern data-collection and processing technology.**
   - **ii) Improving the methods of collecting and compiling statistics on commercial landings in cooperation with the government of British Columbia.**
   - **iii) Improving techniques for compiling statistics on sport and Indian catches.**
   - **iv) Expanding voluntary logbook programs and instating compulsory programs where more comprehensive information is required.**

Information on the composition of catches Information on the age, size and racial origin of catches is also needed to guide managers. Samples of landings provide the required data on age and size.

Catches of herring and groundfish are sampled routinely and apparently extremely well. Sampling of sockeye catches began early in this century, and for some years the catches of all salmon were sampled coastwide. But in 1972, routine coastwide sampling was suspended, breaking a chain of information needed to assess long-term trends in production and stock composition.[5] This sampling program should be reinstated as quickly as possible.

To measure salmon production from particular streams, it is also necessary to determine the racial origin of salmon in mixed catches at sea. This is done by tagging fish so they can be identified when caught; drawing inferences from the timing of runs; and sampling catches to identify the distinctive scales and parasites of fish of different origins. Distinguishing among the stocks represented in catches is especially important where enhanced stocks are caught mixed with wild stocks. In Chapter 2 I alluded to the urgency of data relating to the racial origin of chinook salmon catches.

Parallel techniques are required to identify discrete stocks of herring. This kind of information is essential for effective management and is presently inadequate. I therefore recommend —

3. **The Department should strengthen its information on the composition of catches by —**
   - **i) Reinstating the coastwide sampling program for salmon catches.**
   - **ii) Expanding its programs for determining the racial composition of salmon and herring catches.**

Escapement and spawning data Management of salmon and herring is mainly geared to ensuring adequate escapements for spawning. Thus, measuring the abundance of spawners in the case of salmon, and of spawn in the case of herring, is essential for assessing success in regulating catches as well as analyzing the basic biological relationships between spawning and stock rejuvenation.

The Department's field officers have been estimating the abundance of salmon spawners for 50 years and, for a few important rivers, additional means are used to obtain more precise information. But most of the information collected is so unsystematic and inconsistent that it cannot be used for scientific analysis.[6] Moreover, those who made the estimates have not recorded the methods they used, and so inferences are risky. Even the more detailed information collected in some cases is statistically weak, rarely subjected to rigorous analysis and almost never published. In addition, much of the basic data are inaccessible: the Department's decentralization has left records of escapements scattered throughout the region.

For many years, fishery officers have also been estimating herring spawn, on the basis of the number of miles of spawn observed along the shoreline. But these estimates suffer from the same kinds of inadequacies as those for salmon.

Improving information about escapements and spawning is essential. The obvious first step is to routinely document salmon spawner enumerations and herring spawn estimates so that the information can be assessed objectively and some continuity attained. The second step is to develop a central computerized data system to collate and store information. I understand the Department has begun to organize such a data system as well as a series of stream catalogues summarizing historical escapement data. These are constructive developments. (They will, incidentally, provide valuable information for the aquatic habitat inventory program I recommended in Chapter 3.) The third step is to improve the techniques of enumerating spawning salmon and estimating herring spawn. I therefore recommend —

4. **The Department should strengthen its programs of collecting and collating information on salmon and herring escapements and spawning by —**

i) Requiring those who collect the data in the field to document the methods they use in estimating spawning.

ii) Developing a central data system to systematically collate and store spawning records.

iii) Developing new and consistent techniques for estimating spawning activity.

iv) Assembling historical information on salmon spawning for particular streams and publishing the results in close liaison with the intergovernmental aquatic habitat inventory program (recommended in Chapter 3).

The central data system proposed here should complement the management information system proposed in Chapter 4. The strengthened programs should be developed cooperatively between research and management staff so that the resultant data will be of greatest utility for both research and regulation.

In Chapter 4 I pointed to the need to improve measurements of the abundance of salmon and herring runs during the fishing season through such methods as test fishing and electronic detection. These, too, should be designed jointly by researchers and fishery managers.

Professional Review

A major flaw in the information system for managing the salmon fishery is the absence of routine analysis and reports on the condition of the stocks. Most of the information collected thus remains unutilized and inaccessible. Individual managers sometimes make their own assessments, but others have no opportunity to participate in the process. And because the findings are never documented, others cannot judge the results.

Systematic scientific assessments of all the information available should be an integral part of annual reviews of the salmon fisheries recommended in Chapter 4. Regular peer reviews by the Department's professional biologists would enable them to focus their collective expertise to interpreting the available information for management planning; bring more rigor to assessments that are now disjointed, incomplete and inconsistent; and assist in identifying research priorities. I therefore recommend —

5. In preparing its annual reviews (recommended in Chapter 4), the Department should conduct a scientific assessment of the stocks and of the inferences drawn for management purposes. This review should involve —

i) Summarizing research findings and collating statistical information on catches, fishing effort, escapements and sampling.

ii) Organizing a review of this information by the Department's professional staff and other scientists. The review should appraise the condition and potential of the stocks, and the effects of fishing, environmental changes and (where applicable) enhancement.

iii) Preparing a statement of consolidated advice regarding the consequences of alternative management strategies for consideration by senior administrators.

In making this recommendation I have been influenced by the highly successful arrangements along these lines on the Atlantic coast. There, scientists of the Department's Research Branch work with a formal governmental scientific committee, the Canadian Atlantic Fisheries Scientific Advisory Committee, which —

> . . . is responsible for providing scientific advice to the Atlantic Fisheries Management Committee on the management, including the full range of conservation measures taking into account economic objectives, of all stocks of interest or potential interest to Atlantic coast fishermen. Resource management advice will be provided in accordance with specific fisheries management objectives and strategies and will normally be published as a matter of routine.[7]

Thus specialized scientists, sometimes including experts outside the Department, annually assess each of the major stocks. Their reports summarize the available data on abundance and productivity, assess the consequences of harvesting at various rates, and comment on special management problems and research needs. Their reports are reviewed by a steering committee and consolidated for presentation to the Department's senior managers according to its calendar of consultative and regulatory activity. This process ensures that the best professional advice is brought to bear on management strategies; that management decisions are made in the context of full and publicly visible assessments of their biological implications; and that research priorities are identified and focused on management problems.

On the Pacific coast, the provisions for stock assessments are more rudimentary. The International Pacific Halibut Commission annually reviews the halibut stocks in this way, but the Department's efforts are limited to groundfish. (Similar reviews of herring have been dormant for several years.) The groundfish reviews are apparently thorough, but the biologists do not provide appraisals of alternative management strategies. This is a serious deficiency, because it effectively takes decisions out of the hands of senior administrators and others who should make the final decisions about catch targets and fishing plans taking account of factors other than biology.

For salmon, there are no provisions for regular stock assessments, yet these stocks warrant the most careful review. The scientific panel should be drawn widely from specialists in the Department's research and habitat management branches, the Salmonid Enhancement Program, regional managers and external research institutions.

Smaller fisheries call for more modest and flexible arrangements. All such reviews should be timed to complement the annual formulation of fishing plans and consultation described in Chapters 4 and 17.

Problem-Oriented Research

By problem-oriented research, I refer to investigations aimed at resolving particular management problems that occasionally arise, often with little forewarning. Hitherto, the Department's researchers appear to have responded well to such needs. Examples include investigating the effect of the Babine River slide on salmon stocks; investigating the high seas distribution of salmon in collaboration with the United States and Japan; identifying and treating fish diseases associated with mariculture and enhancement operations, and so on.

Responding quickly to unforeseen problems is difficult in the face of the lengthy cycles of governmental budgeting. And because they usually involve realignments of personnel and facilities, they threaten ongoing research programs. Thus, the special difficulty with research projects of this type is deciding what problems warrant special study, and how much staff and facilities should be diverted to them at the expense of other research.

Inherently, the urgency and nature of such problem-oriented research cannot be prescribed in advance. So I make no specific recommendations on this matter beyond pointing out the need to maintain a capacity to respond to problems as they arise. Unless adequate provisions are made, emergencies cannot be met without disrupting other programs.

Habitat Research

The Department's fundamental responsibility to protect and manage fish habitat involves it continuously in regulating industrial and other activities, often imposing heavy costs on others. So it is important that regulations are based on a firm scientific foundation. Yet the Department has not developed a strong research program on habitat management; consequently, those responsible for managing habitat often impose costly constraints on industrial activities based on guesses about their effects on fish. Not surprisingly, this leads to inconsistencies in regulations, frustration on the part of those who must bear the costs and, I fear, lost opportunities to protect and develop fish habitat.

The single rigorous study conducted in the Pacific region into the effects of logging on the productivity of salmon streams is the Carnation Creek project on Vancouver Island. As I explained in Chapter 3, the preliminary findings of this study challenge some of the accepted beliefs on this question, and this adds to the urgency of such research.

An expanded research program is essential to clarify the effects of disturbances on fish habitats, to develop techniques for mitigating them and to identify methods of improving the productivity of salmon spawning streams.

> . . . research into habitat management has been largely ad hoc and inadequate. We suggest that it is urgent to establish a comprehensive program of research, monitoring and practical trials designed to provide a sound basis for management and protection of fisheries habitat.[8]

The information provided by such research would improve understanding of the interrelationship between fish and forestry, agriculture, and other activities that the Department needs in order to participate constructively in integrated resource management of the kind I recommended in Chapter 3.

> Without this type of background information, fisheries are handicapped in their ability to participate equally in the coordination of their activities with other key resource managers.[9]

This information is also essential for designing long-term objectives for salmon management, as I proposed in Chapter 4. I therefore recommend —

6. **The Department should substantially expand and strengthen its program of scientific research on fish habitats, especially on the freshwater habitats of salmon, the effects of disturbances and ways of mitigating them. This program should include —**
   - **i) Continuation of the Carnation Creek project.**
   - **ii) Initiation of other controlled experiments on the impacts of forestry and other industrial activities in the major ecological systems of the Pacific region and on the effectiveness of habitat protection measures.**
   - **iii) Evaluation of techniques for integrating the requirements of fish with other resource activities, taking account of their biological and economic implications.**

Experiments on the impact of other resource developments on fish habitat can best be organized, like the Carnation Creek Study, through cooperative arrangements with the provincial government and industrial companies. Such research should be designed to complement the aquatic habitat inventory program I proposed in Chapter 3.

Fundamental and Conceptual Research

Fisheries management and development programs are ultimately based on models and hypotheses about the dynamics of fish populations, the interactions between fish and their environment, the effects of harvesting and so on. In order to improve the Department's operational management techniques, these hypotheses must be continuously tested, revised and elaborated by means of fundamental biological research.

This more profound research involves long-term studies requiring continuity and some insulation from day-to-day problems. But many of the Department's on-going activities are fertile sources of data: enhancement projects, fishing programs and properly monitored changes to the environment can all yield valuable information for testing scientific concepts. So, while basic scientific research should not be disrupted by the kaleidoscope of immediate problems, it should nevertheless be conducted in close association with the Department's management and development programs.

The Department's Research Branch has developed considerable strength in basic biological research and contributed substantially to scientific understanding of fish population dynamics, environmental influences on the survival of salmon in streams and the propagation of shellfish, among other things. My investigations have identified needs for basic research on other problems: the basic relationships between salmon and herring escapements and stock recruitments, which I have already emphasized; the genetics of salmon; the early life of salmon at sea; and the feasibility of culturing fish. An important question for fisheries management policy in this region is the interdependence among salmon, herring, dogfish, seals and sea lions. Conflicting opinions about these were revealed at the Commission's hearings; yet the Department has no organized program of research to clarify the underlying relationships needed for informed management decisions.

But I am unable to recommend the specific components of the required program of basic research, for several reasons. First, doing so would call for scientific judgements that are beyond my expertise. Second, the benefits of such research are always uncertain, and to minimize the gamble, priorities should take account of the quality of proposals and the talents of the available staff. And third, I have already recommended in Chapter 4 a general assessment of fish stocks, identification of management problems and the options for future management and enhancement. This thorough review should provide the context in which long-term research priorities are set.

Economic, Social and Industrial Research

The Department's research effort has always emphasized biology, engineering and the technology of fishing and processing. But in recent years, as the Department has become increasingly caught up in industrial regulation, it has also undertaken studies relating to fleet rationalization, industrial organization, marketing and social and regional development programs.

Clearly, the Department's responsibilities extend well beyond the management of fish and fish habitat; and, as I have suggested throughout this report, its responsibilities for such matters as licensing, regulating access, fleet development, assessing enhancement and other development plans, regulating sportfishing and designing Indian programs all need increased attention. These problems call for expertise in economics, business organization and social science. It is therefore important that the Department maintain expert staff in these fields to provide the analysis and advice required to guide its program development. In this regard, the serious erosion of its economics staff in recent years is disturbing, particularly in view of the attention that now needs to be devoted to improving the economic performance of commercial fleets, to evaluating enhancement priorities and to developing opportunities for new fisheries such as mariculture.

But while the Department must maintain competent staff in these other disciplines, I do not recommend that it devote significant staff and budget to research in these fields. The primary need is for guidance in determining policies and priorities arising from initiatives from the Department's management and administrative staffs. Beyond this, some separate research is sometimes needed on particular questions; later I suggest a need for research into sportfishing values and industrial problems, for example. Such special studies can sometimes be contracted out.

RESEARCH ORGANIZATION

The Department's organizational and administrative arrangements have tended to isolate its researchers from fisheries management programs. In order to accelerate progress toward the Department's espoused goal of "totally integrated fisheries management,"[10] attention must be given to arrangements that will encourage teamwork among research scientists, field biologists, economists and managers.

Presently, research needs that arise out of management problems are passed on informally to the Research Branch through the Director General. The Research

Branch annually reviews and redesigns its research plans, but only internally, so that those with direct management responsibilities are rarely involved. Conversely, researchers have little to do with planning the investigative work of field biologists. In short, present arrangements fail to provide a system for communicating to researchers the problems faced by resource managers, identifying the questions that can be answered by research, assigning priorities to them, and organizing the research effort to meet management requirements most efficiently. To alleviate these deficiencies, I recommend —

7. **The Department should organize a regular process for reviewing research activities and revising priorities with the advice of Departmental managers and outside scientists, and annually report its research activities and plans for public information and for appraisal by the Pacific Fisheries Council (see Chapter 17).**

The present organizational structure for research is awkward, with its centres of responsibility being geographically scattered. In Chapter 19 I propose that these arrangements be thoroughly examined in the context of a general financial and administrative review of the Department.

That review should include also the appropriate role of the Department's Freshwater Institute in research in the Pacific region. I understand that the institute, based in Winnipeg, is concerned with freshwater fisheries management research, but that it does not address problems in the Pacific region. Yet the fresh waters of this region that support salmon are probably the most productive in Canada, and certainly warrant high research priority, especially in respect of habitat management.

It remains to comment briefly on the relations between the Department and other groups involved in fisheries research. In Chapter 4 I referred to the work of the International Pacific Salmon Fisheries Commission and to the opportunities for improving communication among those concerned with Fraser River salmon fisheries. Fisheries research is conducted at British Columbia's three public universities, and indeed in most other major universities in Canada. Recently, following a long period of little contact, the Research Branch has begun to cultivate closer relationships with university scientists by providing research support and post-doctoral fellowships at the branch's research laboratories. These developments offer scope for mutually advantageous research and should be encouraged. The newly formed Fisheries and Oceans Research Advisory Council offers a medium for fostering cooperation between governmental researchers and academic scientists as well as those involved in investigations and data collection in the private sector.

In recent years, federal departments have been encouraged to contract out research, and both the Research Branch and the Salmonid Enhancement Program now spend considerable sums on contracted research. For many investigations, this arrangement has worked well, relieving the Department of the necessity of maintaining specialized staff for temporary needs. It has also promoted the development of fisheries expertise in private consulting firms. But this policy should be pursued cautiously. Governmental limitations on staff may create pressures for contracting out research beyond the level at which it is most economical to do so or at the cost of quality. And the Department must maintain sufficient well-informed, in-house expertise to sustain a viable research capability and especially to ensure continuity in accumulating the basic information needed for biological studies.

Finally, I emphasize the importance of documenting and publishing research findings. This provides the essential means of communicating findings and for critically reviewing research quality. I have also advocated the publication of an annual review of the Department's research program. This, with advice from the Fisheries and Oceans Research Advisory Council and the Pacific Fisheries Council, will contribute to both the quality and relevance of the research effort.

CONCLUSION

Early in this chapter I noted that the personnel and budget devoted to fisheries research in the region is considerable. Although I have proposed strengthening the research effort in certain respects, I do not mean to imply that research resources must necessarily be increased. I have found so many deficiencies in the way the Department organizes its research and determines its priorities that, until the resources are assessed, the scientific needs of management are identified, and the administrative organization is reviewed, the adequacy of current provisions cannot be judged.

My review of the Department's research effort suggests that its standards of biological science have generally been high. But having passed through several phases, the research program has recently drifted away from its former close links with resource management. This has resulted partly from deliberate decisions and partly from recurrent administrative reorganizations. The Department now appears to recognize the need to overcome this isolation and to integrate its research more closely with management requirements. My recommendations are aimed at hastening this process and at improving the scientific foundation for fisheries management.

Because of the rapid developments in Pacific fisheries and the multitude of problems that now must be resolved, the task of reorienting scientific research and information programs should be addressed immediately.

The present circumstances of the Research Branch suggest that this is an auspicious time to initiate a redirection of priorities, and if this is done it offers considerable promise for accelerating improvements in resource management and development.

FOOTNOTES

1. The Canadian Fishing Company Limited, Exhibit #73, p. 2.
2. Department of Fisheries and Oceans, Exhibit #182, p. 4.
3. D.A. Pepper, Exhibit #183, p. 5.
4. Exhibit #182, p. 4.
5. See W.E. Ricker, H.T. Bilton and K.V. Aro, Causes of the Decrease in Size of Pink Salmon (*Oncorhynchus gorbuscha*). Fisheries and Marine Service Technical Report, 820, 1978; and W.E. Ricker, Causes of the Decrease in Age and Size of Chinook Salmon (*Onchorhynchus tshawytch*). Canadian Technical Report of Fisheries and Aquatic Science, 944, 1980.
6. See C.J. Walters and D. Ludwig, Effects of Measurement Errors on the Assessment of Stock-recruitment Relationships. Canadian Journal of Aquatic Sciencies, Volume 38, 1981, pp. 704-710; and D. Ludwig and C.J. Walters, Measurement Errors and Uncertainty in Parameter Estimates for Stock and Recruitment. Canadian Journal of Aquatic Sciences, Voume 38, 1981, pp. 711-720.
7. Terms of reference of the Canadian Atlantic Fisheries Scientific Advisory Committee, in Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC), Volume v, Annual Report 1977-78.
8. MacMillan Bloedel Limited, Exhibit #146, p. 3.
9. Council of Forest Industries, Exhibit #135, p. 19.
10. Exhibit #182, p. 4.

Part III

Commercial Fisheries

CHAPTER 7

LICENSING AND FLEET DEVELOPMENT POLICY

> *. . .the present fisheries policy instruments have failed to encourage practices that would efficiently capture the potential natural wealth of the industry.*
>
> ECONOMIC COUNCIL OF CANADA[1]

To realize the potential benefits of our fish resources we must, first, properly manage the stocks and their habitat; and, second, provide a system of access to the resources that will promote their most efficient use. The latter entails some kind of licensing system. To provide the background for the detailed proposals regarding commercial licensing policy that follow, this chapter outlines the role of licensing in regulating fleet development, current licensing arrangements and the basic objectives of a modern policy. The following five chapters deal with the methods for achieving these objectives in the various commercial fisheries of the Pacific coast.

The background provided in this chapter is important for three reasons. First, it is only in recent years that access to commercial fisheries has been controlled; traditionally, fleets were unrestricted so that the licensing system, as a means of control, was of little significance. But the need to regulate the size and structure of fishing fleets is now the most urgent issue of commercial fisheries policy. So the design and administration of licences warrants a central place in fisheries policy — a much more prominent place than it has hitherto been given.

Second, the licensing system determines how access to the available harvest will be allocated among potential users, and this gives rise to the sharpest debate and friction among user groups, and between them and the regulatory authorities. For this reason, licensing arrangements must be seen to be defensible in light of explicit objectives, and to be consistent, understandable and fair. Hitherto, this consistency and clarity has been lacking.

Third, my public hearings revealed a great deal of confusion about the legal, economic and administrative aspects of this new and complicated aspect of fisheries policy. And because so much needs to be done to modernize our present crude licensing structure, it is essential to begin with a clear statement of policy objectives, history and alternative approaches and their implications.

My Preliminary Report also gave special emphasis to commercial licensing arrangements and fleet development policy; indeed, these were the specific issues that my terms of reference required me to deal with and make recommendations upon last year. Accordingly, I recommended a variety of important changes, some of which are now being implemented. Those proposals dealt only with certain fisheries, and even in those cases I indicated that I would consider additional changes in my final report. In the following chapters, I incorporate most of my preliminary recommendations, and the changes made by the government in the interim, in a fuller review and more comprehensive set of proposals for reform of licensing policy.

FLEET DEVELOPMENT AND THE TREADMILL OF OVERCAPACITY

The central economic problem of the commercial fisheries is the chronic overcapacity of the fleets. As I describe in later chapters, all of our major fisheries, especially the salmon, herring and halibut fisheries, have greatly expanded their fishing power in recent years. But because the stocks of fish could not yield greater catches, most of the new capital investment in vessels and gear and the advanced technology is wasted. Our most valuable stocks could be fully harvested with only a fraction of the capital and labour now expended on fishing them. This wasteful pattern of development reflects governments' failure, in spite of repeated attempts, to develop a policy that would encourage the industry to develop efficiently.

The perplexing phenomenon of excessive expansion of productive capacity is not limited to Canada's Pacific fisheries; it can be observed in major fisheries throughout the world. In recent years, licensing systems in considerable variety have been designed to alleviate the problem, though few can be said to have had much beneficial effect.

A clear understanding of why commercial fleets tend to overexpand is essential in order to design effective corrective policies. Although this has been well analyzed in academic and official studies during the last few years,[2] my hearings revealed considerable confusion about the problem within the fishing community and, judging from the policies adopted, within the government as well. So a brief explanation of the general phenomenon is in order before turning to policies required to deal with it.

The perverse tendency for fishing fleets to overexpand is rooted in the way the commercial fisheries have traditionally been organized. Until very recently, fisheries throughout most of the world were open to unrestricted numbers of fishermen and fishing enterprises. Harvesting was, and still is, based on the "rule of capture"; that is, unlike other natural resources, fish in the sea are not assigned through property rights or licences to any particular users; each user competes directly with all the others for a share of the catch, and has no right to any particular quantity until he has landed it.

In these circumstances, temporary profits will stimulate fishermen to expand their vessels' fishing capacity in order to increase their catch, and will attract new entrants into the fishery. So the fleet will expand even if it is already capable of taking the entire harvest. Thus, as we have seen repeatedly on the Pacific coast, an increase in the price of fish will set off a wave of investment in vessels and gear even when there are no more fish to catch. The result is the excess fishing capacity we observe in all of our major fisheries.

Several effects of this phenonenon should be noted. First, it threatens the stocks because constraining overexpanded fleets to the yield capabilities of the resources is difficult.

> In an open-access, free-for-all fishery, competing fishermen try to catch all the fish available to them, regardless of the consequences. Unless they are checked, the usual consequence is a collapse of the fishery. . . .[3]

Ironically, these pressures sometimes have the opposite effect: they prevent full utilization of the available catches because fisheries managers fear that an opening of a small fishery will attract so much fishing power that the stock will be decimated.

Second, the redundant capacity raises the capital, labour and operating costs involved in fishing, and so erodes the net returns the fishery could otherwise generate. The scope for carrying the extra costs of surplus capacity is greatest in those fisheries that are capable of yielding the highest returns. Thus we find the most conspicuous overcapacity in our most valuable fisheries — salmon, roe-herring and halibut — and less in our marginal fisheries. So even the most valuable fisheries yield low returns in the long run because the effort expended tends to rise, and the costs inevitably increase to the point where they are equal to, or absorbed in, the full value of the harvests.

Third, such fisheries are unstable. Any increase in the available catch, or rise in the price of fish, or technological development that lowers the cost of fishing effort, induces fleet expansion; opposite changes force painful contraction through financial failures. This has been the dismal history of major fisheries on Canada's Atlantic as well as Pacific coast, and indeed throughout the western world.

All of these effects — stock depletion, poor economic performance and instability — result from treating the resource (the fish) as common property until they are caught, and are normal whenever resources are treated this way. It is "The Tragedy of the Commons."

The overexpanded fishing capacity is not the result of irrational behaviour on the part of fishermen. When an industry is profitable, the producers will usually expand their productive capacity; and as long as there are no serious barriers to new entrants to the industry, their numbers will grow. But unlike most other industries, such expansion in fisheries takes place even when no additional production is possible. The harvest is simply spread more thinly across the expanded fleet and the cost of fishing is driven upwards.

The technology of fishing becomes distorted as well. Competing for larger shares of the catch, vesselowners are driven to adopt questionable innovations to increase the speed of their vessels, to increase hold capacity, to reduce running time and to build vessels capable of working further offshore in order to intercept fish before others. These add to the cost of fishing and distort the fleet's structure.

The potential net returns (or "resource rent," in economists' jargon) in the major fisheries of the Pacific coast are very high. For example, I have no doubt that our catches of salmon and roe-herring could be taken with fleets half their present size and at half the cost now expended in fishing. If this were done, the value of the landings could well exceed the costs of harvesting in these fisheries by something in the order of $75 to $100 million annually. Currently, these potential returns are not realized at all; they are dissipated in excessive costs of fishing.

So, in the interests of both resource conservation and industrial performance, fisheries policy must reverse the tendency of fleets to expand their fishing capacities redundantly and reduce the accompanying waste in capital and labour. Indeed, protection and enhancement of the natural resource can be of little benefit if the major user, the commercial fishery, remains so inefficiently organized.

The conspicuous economic waste in overexpanded fleets figures importantly in this report because my terms of reference direct me to make recommendations toward ensuring that the regulatory system will promote "economic efficiency in the development of the commercial fishing fleet." My recommendations in this part of my report are therefore aimed at rationalizing the commercial fishing fleets, reducing the excess capacity and associated excessive costs of fishing, and thereby allowing the significant net returns that our resources are capable of yielding to be realized.

Who should be the recipients of these gains is a separate question. But on this matter, too, my terms of reference provide guidance; after allowing "fair and reasonable returns to commercial fishing enterprises" the surplus should accrue to the Crown. In formulating my proposals, I have interpreted this to mean that the manpower engaged in the fisheries should receive incomes, on average taking one year with another, comparable to those of workers with similar skills in other industries in western Canada, and that those who invest capital should earn a rate of return comparable to that in other industries of comparable riskiness. Returns greater than that constitute resource rents and should be captured by the government through levies that are "consistent with the value of resources recovered . . . ."

Hitherto, no surplus has been generated for the Crown to collect because of the excessive costs of fishing. Instead of the substantial surpluses that well-organized fisheries could yield, public revenues have been well below the cost of management and administration, so the direct return to the people of Canada has been negative.

Furthermore, the returns to fishermen and vesselowners have usually been modest and highly unstable. The historical pattern has been one of temporary prosperity during favourable conditions, inducing new investments in fishing power, which in turn aggravates the financial pressure on the fleet during the subsequent downturns.

FACING THE CHALLENGE

While this report is being written the Pacific fisheries are suffering serious depression. This condition is aggravated by a variety of short-run and external influences relating to markets, interest rates, fuel prices and so on. But it is important to recognize the more fundamental problem: that the fishing industry will always be in a precarious economic condition if the potentially substantial margin between its revenues and costs is allowed to be swallowed up in wasteful expansion of fishing capacity and higher costs. The greatest single challenge in reorganizing the policy framework for the commercial fisheries is to stop this treadmill of overcapacity, and further to reduce the present excess capacity, so that fishermen can receive reasonable returns and the people of Canada can begin to realize some of the substantial surplus that the fisheries are capable of yielding with a better fleet structure.

Governments, having issued too many fishing privileges for efficient utilization of the resource, have often responded with measures that aggravate the problem. To protect stocks, they have applied restrictions on gear, and fishing time and areas in order to control fishing effort, with the result that the fisheries are now among the most highly regulated industries. Regardless of the effectiveness of these restrictions in protecting the stocks, they do nothing to control expansion of the fleet; instead, they accommodate excess capacity. Furthermore, subsidies have been introduced to improve fishermen's earnings and to assist fishermen with investments in new or improved vessels. Obviously, this kind of financial support, whatever its other social effects, tends to lower the cost of, and thus enhance the returns from, fishing. Hence, it fuels the expansion of redundant fishing capacity.

Governmental support for ailing fishing industries has sometimes been justified on grounds of protecting employment opportunities or social development. I have already pointed out that fisheries policy must be sensitive to social needs, and later I recommend measures to mitigate dislocation as the fisheries are rationalized. But governments should be dissuaded from attempts to generate employment in overcrowded fisheries.

> To the extent that there are more fishermen than the industry can reasonably support, more processing facilities, more shore-based and water-born jobs than are justifiable from a pure economic standpoint, then the industry must be considered as one in which government regulation and policy is imposing a special social tax.[4]

In contrast to almost any other make-work measures, more fishermen cannot generate more product or service; indeed, to the extent that another fisherman catches fish, he simply reduces the production of others.

Later, I point to a need for more effort in managing fish and to opportunities for enhancing and culturing stocks. These are the sectors of the fisheries where more labour and capital can be productive. Hitherto, we have spent far too much on catching fish and too little on managing and producing them.

Submissions at my public hearings reveal a widespread recognition of the need for governments to put behind them the traditional open-access regime of the fisheries. But there remains a disturbing dissenting opinion; some fishermen insist that the government should fix the total catch and nothing else, leaving "free market forces" to sort out the efficient from the inefficient fishermen. According to this view, to attempt more than this would be to interfere with the free enterprise system as it applies to fishing.

This position contains a fundamental misunderstanding. The free enterprise system depends on someone having control over all of the factors of production, including natural resources, and ensuring that they are used in the most profitable way. Common-property resources have no place in the market system of economic organization;

indeed, common property is repugnant to the principles of a market economy, and those that invoke the virtues of free enterprise should be the least satisfied with the free-for-all of open fisheries. Alternatives to common property are less obvious for fisheries than for some other resources, like land or forests that can be easily parcelled out, but I shall identify some later in this chapter. Whatever their shortcomings, they cannot be regarded as interferences with free enterprise in the fisheries. Nor, for that matter, does common property fit within classical socialism, which implies centralized ownership and control by the state with no competitive exploitation by independent fishermen. No more can be said for common property on political grounds than on economic or conservation grounds.

EVOLUTION OF FLEET DEVELOPMENT POLICY

Having examined the early development of the Pacific fisheries and fisheries policy, I am struck by the continuity of the problem of overcapacity and the failure of policy-makers to learn the lessons of history. The brief sketch that follows is intended to emphasize the need for fundamental policy changes to avoid further repetition of past mistakes.

Early Attempts to Control Fleet Expansion

The need to control the expansion of fishing fleets in Canada's Pacific fisheries has been recognized by astute observers for nearly a century. In the 1880s, anxieties about overexploitation of salmon on the Fraser River were sharpened by the apparent depletion of stocks in the Columbia and Sacramento Rivers to the south. As early as 1887 a fisheries official on the Fraser River opined that "it is about time that some limit . . .be placed on the number of nets allowed on this river. . . ."[5]

Two years later, in 1889, the federal government limited the number of licences for fishing boats on the Fraser to 500. Three hundred and fifty of these were distributed among the canneries according to their canning capacity. The only way they could obtain more licences was to expand capacity, and as the fishery became more profitable, the canneries, predictably, did just that. New canneries were built as well, the number increasing from 12 to 18 within 3 years. The vessel limitation scheme therefore broke down and was abandoned in 1892. By the following year, the number of licences had doubled to more than a thousand.

A second experiment was attempted on the north coast, where nearly all the fleet was owned by canneries. By 1907 the Commissioner of Fisheries for British Columbia had become alarmed at the increasing number of boats and, fearing a repetition of the Fraser River experience, proposed that "no additional canneries should be permitted to be constructed in the North, anc that a limit be placed upon the number of boats whicl the existing canneries should be permitted to operate."[6] A limit was instituted the following year. Under the allotments, 850 boats were allowed to fish the Skeena; anc 750, Rivers Inlet. Boats were allocated among the canneries through private negotiations among them. Inevitable disagreements arose, which threatened to cause the arrangements to collapse. So in 1910 the provincial government took control, determined to enforce a "solutior of a problem which has wrecked many of the salmor fisheries of the Pacific Coast and has constantly threatened all."[7]

But again, high profits in fishing led to the demise o the regulatory system. As the value of salmon escalatec during the First World War, the government acceded tc pressures to issue licences to new canneries. And, unde pressure to provide job opportunities for returning soldiers at the war's end, the federal government lifted al restrictions on cannery licences in 1917.

The established canneries objected strongly to the return of unlimited access; the government responded by appointing a royal commission (the Evans Commission to investigate the problems of the salmon industry. The commission's report reveals a remarkably perceptive understanding of the need for controls.

> . . . it seems to us equally clear that all conditions surrounding the industry should as far as possible be stabilized and the excessive use of capital and labour obviated or prevented. . . . The solution of this problem would not seem to be found in encouraging or permitting the employment of more capital or more labour than can efficiently perform the work. . . . If the cost of production becomes too great all hope of advantage to the public as consumers will disappear.[8]

The commission therefore recommended limiting the industry and collecting the excess profits that woulc result from price increases. These recommendations were not adopted, however.

The fisheries continued to expand, and several decades later, in 1958, Dr. Sol. Sinclair was appointed to investigate the salmon and halibut fisheries. By that time the general theory of why common-property fisheries inevitably overexpand was better understood. Sinclair proposed a system of restricted vessel licences and levies on the catch to dampen incentives to overinvest.[9] These recommendations were vigorously debated and provided the basis for the licence limitation plan (the Davis Plan introduced for the salmon fishery a decade later.

The Davis Plan

In 1968 the Minister of Fisheries announced an innovative program to control the salmon fleet through a system of restrictive licensing of vessels. Its purpose was "to increase the earning power of British Columbia salmon fishermen and to permit more effective management of the salmon resource by controlling the entry of fishing vessels into the fishery. . . ."[10] The Davis Plan, named after the minister at the time, was designed to prevent further fleet expansion and subsequently to reduce its size and rationalize its structure.

The plan involved four phases. The first phase required freezing the number of vessels by licensing only those that could show a significant dependence on the salmon fishery (though some others were licensed as well). The second involved reducing the fleet by purchasing and retiring excess vessels. The third was concerned with improving vessel standards and product quality. The final phase, which was never pursued, entailed improving the fleet's structure and relaxing some of the restrictions on fishing effort of the reduced fleet. The structure and evolution of the program is described in more detail in Chapter 9.

Today, after more than a decade of restrictive licensing, the number of vessels in the salmon fleet is smaller, the fleet's structure has changed significantly, and the vessels are much improved in technical sophistication and safety. But the plan has clearly failed in its main purpose, which was to control and reduce excessive fishing *capacity*. Investment in fishing power continued as the value of the catch increased, and the capacity of the fleet, already excessive when the program began, doubled or perhaps trebled.[11]

In retrospect, the program probably initiated the first difficult steps in bringing the fleet under control, but it seems to have been overtaken by events, and it was not developed sufficiently to achieve its basic goal. One group summarized it in a submission to this Commission as follows:

> The Davis plan was successful in providing one of the world's most efficient and modern small boat fleets. And therein lies the problem. The fleet has a tremendous increase in catching power at the cost of a near total dissipation of economic rents.[12]

At least one clear lesson can be learned from this history: fishermen and vesselowners will try to expand their fishing power whenever they compete with each other for an unspecified share of the catch of a common-property resource, even if the fleet's capacity is already excessive. When the value of the catch rises and governments fail to capture the extra returns from fishing, the fishermen will reinvest them in expanded fishing capacity until the higher costs absorb the higher revenues. Restrictions on the number or dimensions of vessels will not prevent this investment in greater fishing power.

CURRENT LICENSING ARRANGEMENTS

Despite its evident failures, the basic form of restrictive licensing adopted for the salmon fleet was subsequently adopted for the other major fisheries on the Pacific coast in response to similar problems of overcapacity and excessive pressures on the stocks.

Restricted Licences for Commercial Fisheries

Today, restrictive licensing systems are in place for 10 Pacific fisheries. These are summarized in Table 7-1. Several other fisheries are regulated under special Minister's permits, which are not restricted in number. Excluded also from Table 7-1 are the processor licences, packers licences and personal commercial fishing licences discussed in Chapter 13, and the sportfishing licences described in Chapter 15.

As already noted, the various restrictive licensing systems have been introduced over the last decade in response to particular problems facing individual fisheries and they have been designed in light of accumulating experience. As a result, the various systems differ in fundamental respects with no apparent rationale. The terms and conditions of licences and the way they are administered have not been well documented, so it has proven difficult to sort out some of their complexities.

General provisions for licensing are set out in the Pacific Fishery Registration and Licensing Regulations.[13] Some of the regulations are common to all the various licence forms: all licences are valid for one year and are renewable; they must be renewed each year by May 31st (except for roe-herring and sablefish licences, which must be renewed by January 5th and November 5th respectively); all vessels (except roe-herring gillnet punts) are subject to some form of replacement restrictions; and when a vessel with licences to fish in two or more restricted fisheries is replaced by another vessel, all of its licences must be transferred to the new vessel. All of the limited-entry licence privileges are transferable between persons by one method or another.

These regulations also provide the Minister with the discretionary power to grant a licence to an applicant who would not otherwise qualify, but this prerogative is limited to cases where failure to meet the normal qualifications was due to factors beyond the applicant's control. The Minister may also suspend or cancel a licence, or refuse to re-issue one, if the owner of the vessel is convicted of a violation of the Fisheries Act or regulations.

TABLE 7-1 Summary of licences for commercial fisheries

licensed fishery		number issued in 1981[a]	licensed factor	factors restricted	licence fee
salmon					
ordinary	A	4171	vessel	vessel length and tonnage	$200 to $800[b]
Indian	AI	376	vessel		$20
temporary	B	192	vessel		$20
roe-herring, ordinary	H				
gillnet		917[c]	person	area fished	$200
seine		190[c]	person	area fished	$2000
roe-herring, Indian	HI				
gillnet		376[c]	person	area fished	$10
seine		53[c]	person	area fished	$10
halibut					
ordinary	L	431	vessel	vessel length	$10
special Indian		10	person	vessel length	$10
groundfish trawl	T	148	vessel	vessel length	$10
shrimp trawl	S	248	vessel	vessel length	$10
sablefish	K	41	vessel	vessel length	$10
abalone	E	26	person	catch	$200
geoduck	G	45	vessel	vessel length	$10
spawn-on-kelp	J	28	person	catch	$10 or $2000[d]
selected species	C	1114	vessel	vessel length	$10

[a] Data as of December 18, 1981

[b] See text

[c] 1982 data

[d] The $10 fee applies to Indians

Source: Department of Fisheries and Oceans.

Four Basic Forms of Licences

Four basic types of licences can be identified in the present array. These prototypes must be distinguished because much of what I propose in later chapters involves reassigning the most appropriate form of licensing to each major fishery.

First are *unrestricted licences*, which do not limit entry to the fishery. This traditional form is now almost extinct, remaining only in certain minor and underutilized fisheries regulated under selected species licences described in Chapter 10. However, the number of licences that are eligible to engage in a number of other fisheries, such as food herring, crabs and hake, is so large in relation to the number of present participants that access is effectively unrestricted in these cases also.

Second are *limited-entry licences*, which limit the number of participants. All of our major fisheries are now regulated under this kind of licensing. Under this system the authorized catch of each licensee is unspecified so, although the number of persons or vessels with licences is fixed, all the incentives to wastefully invest in excess fishing power remain. The success of these licensing systems in countering these incentives hinge on their ability to prevent additional investment in fishing capacity, through more or less arbitrary vessel replacement rules and controls on vessel improvement.

Third are *quota licences*, which assign a specified catch to each licensee. Such licences are now in place for the abalone and spawn-on-kelp fisheries. The outstanding advantage of this form is that it eliminates the competitive scramble for a share of the catch and so eliminates incentives to invest in excess fishing capacity. By doing so, it also eliminates the need for much of the detailed regulation of the fleets and of fishing.

The fourth are what I call *mariculture leases*, which assign to a licensee (or lessee) specific privileges and obligations over a defined area, so that within the area the common-property problem is eliminated altogether. The Province of British Columbia's oyster leases take this form, and the federal spawn-on-kelp licences have some of the same characteristics. Such arrangements not only encourage efficient harvesting, but also provide the conditions for private culture, enhancement, management and protection of fish.

OBJECTIVES OF LICENSING POLICY

Licensing policy on the Pacific coast has evolved quickly in recent years in response to urgent problems associated with particular fisheries and accumulating experience. The result is that today it lacks coherence and consistency, particularly in the provisions relating to such matters as the appurtenancy of licences, the fee structure, transferability and criteria for renewability and replacement. Moreover, in the more important fisheries the system has obviously failed in its primary purpose of controlling fleet expansion.

To bring some order to this important part of commercial fisheries policy, a clear statement of the purposes and objectives in regulating fishing privileges is needed. The following paragraphs identify these basic purposes and objectives, which therefore provide a framework for evaluating the strengths and weaknesses of present licensing arrangements. The components of this framework follow from those aspects of the Commission's terms of reference that stress the need to protect the public interest in fish utilization; to ensure that the method of granting fishing privileges will promote proper resource management and conservation, equity, and efficient fleet development; and to ensure that charges for the right to fish commercially are consistent with the value of the resources utilized.

Resource Management and Conservation

Licensing arrangements, like other aspects of fisheries policy, must be designed to facilitate proper resource management and to conserve the fish resources. These requirements entail the following. First, the total catch must be controlled to protect the stocks from depletion. Second, the composition of the catch must be controlled. This is because the sustainable yield from a stock of fish usually depends not only on *how many* fish are caught, but also on *what* fish are caught (in terms of age and size) *when* they are caught and *where*. This means that fishing gear, time and areas must all be regulated. So any licensing system must accommodate these requirements.

Fleet Development

The licensing policy must also be designed to promote efficient development of the fishing industry. In the past, in order to control the total catch, the harvesting ability of the fleet was progressively reduced through restrictions on fishing time and gear. Such controls can certainly reduce effective fishing effort, but they are a highly inefficient way of doing so from both a technical and economic point of view. Simply preventing the fleet's capacity from expanding beyond the level required to efficiently harvest the catch would be much better.

So a licensing system should provide the means to prevent fleets from expanding excessively.

Indeed, this must be the primary aim in all those fisheries that have been permitted to overexpand, because as the major organization of fishermen points out, this is the most urgent problem.

> The central internal problem facing the commercial fishing industry is one of overcapitalization . . . overcapitalization is the plague that robs fishermen of a decent living and ultimately applies increased pressure on fish stocks.[14]

I would add that it robs other Canadians of their due return from their fish resources as well.

It is important to recognize that the problem of overexpansion is not simply one of too many boats, as is sometimes suggested; controlling numbers of vessels will not limit a fleet's capacity if their individual fishing power is allowed to expand. Moreover, the economic problem does not arise from the expansion of fishing power as such but from the unnecessary cost of too much labour and capital employed in fishing. This is important because the fishing capacity of a fleet might be restricted by limitations on vessels, gear and fishing time, yet investment and the costs of fishing might continue to grow (as we have seen from long experience). Economic rationalization of the fleet calls for measures to ensure that no more labour and capital will be expended in fishing than is required to harvest the catch, so that costs will not be excessive. This must be the primary objective of a licensing policy and the main criterion for evaluating its success.

In addition, the licensing policy must ensure that the fleet distributes itself efficiently among stocks and fishing grounds; and it must promote, or at least not impede, the development of an efficient and competitive processing industry.

These considerations are not independent. Efficient organization of the primary fishing sector to harvest the catch at low cost will provide scope for increased returns to labour and capital throughout the fishing industry, and provide the best opportunities for successfully competing in world markets for fish products.

Flexibility

The fishing industry is susceptible to rapid changes in markets, in fishing technology, and in the availability of the resources themselves. Fisheries policy must recognize this instability, and licensing arrangements must be adaptable to unforeseeable changes in circumstances without depending on continual governmental intervention. This implies, for example, a system that will allow the fishing industry to respond to changes in technology or prices without setting off a wave of unproductive investment, and that will allow regulators to change the allowable catch in light of resource requirements without abrogating established rights.

Security

Fishermen and vesselowners are vulnerable to shifts in the industrial environment that are beyond their control.

Fluctuations in world prices for fish, new technological innovations in fishing, trends in costs of fuel and other needs, and changes in resource availability are not only unpredictable and uncontrollable by private individuals but in large part by governments as well. While a fisheries policy can do nothing about these uncertainties, by setting out clear long-term fisheries policy goals it can do much to enable more purposeful private investment and planning. In addition, the licensing arrangements themselves should be designed to provide as much certainty as possible by using appropriate terms, by containing unambiguous provisions with respect to renewability and transferability and by clearly documenting policies and practices rather than by relying on vague administrative practices.

Public Revenues

The charges now levied for fishing privileges are so low they do not even come close to covering the costs of administering and managing the resources, and the eroded returns to fishing resulting from the overexpanded fleet leaves little scope for increasing them. The present licence fees are also inconsistent, and devoid of any apparent equity. If they are to be made "consistent with the value of the resources recovered, after fair and reasonable returns to commercial fishing enterprises," as my terms of reference dictate, the present structure of levies must be substantially altered and rationalized.

Social Goals

Among the most important objectives of fisheries policy is that of ensuring opportunities for fishermen to earn reasonable incomes. This underlies the need for proper resource management and industrial development. But beyond this, fisheries policy, probably more than any other industrial policy, has been formulated with perceived social and economic needs of particular groups, communities and regions in mind. This can be explained by the historically poor economic environment of the fisheries, the economic and cultural dependence of certain ethnic and social groups on fishing and the identification of fishing with particular regions and communities with few alternative employment opportunities.

Many fishing groups on this coast feel that the fisheries authorities have been excessively preoccupied with regulating people at the expense of resource management and industrial development. I am not sure that this criticism is justified, but my review of the licensing arrangements has convinced me that the measures used to protect the interests of particular groups and communities have been inconsistent, sometimes contradictory and often unsuccessful. Certainly, the measures taken in the past to maintain the participation of Indians in the commercial fishery, to protect the position of small operators and to prevent encroachment by one sector of the fleet on another have been only partly successful at best.

Because of the present predicament of the Pacific fisheries and of those involved in them, fisheries privileges must recognize certain pressing social problems and contribute to their solution. The need for economic opportunities for Indians and for coastal communities dependent on fishing are the most urgent of these. In contrast to past policies, the special economic and social problems must be clearly identified, the methods to be used to alleviate them should be agreed upon and the particular role that fisheries policy is to play should be specified in a coherent and consistent form. Only then can the fisheries authorities be expected to administer licensing and other arrangements that will serve these special purposes effectively. The Department of Fisheries and Oceans is not necessarily the appropriate agency to identify social problems or to design corrective programs, and it may be that it has too often attempted to do so. But where such problems exist, and modifications to fishing arrangements afford the best means of improvement, fisheries policy should be appropriately modified.

Certain other considerations go beyond assistance for particular groups. It is important to maintain not only economic opportunities in fishing but also the fisherman's lifestyle, the viability of small independent operators and access to the industry for young people. These issues call for especially sensitive policy making at a time of change and industrial rationalization.

Simplicity

The licensing system has become extremely complicated, and it has been imposed on an industry that was already intensively regulated. Some of the complexities are the result of the experimental nature of the licences, which were introduced, one after another, to deal with different circumstances and problems. Other complexities arose as new regulations were designed to deal with unforeseen deficiencies in old regulations.

The different kinds of licensing systems vary widely in their requirements for information, in their administrative complexity and in their demands on enforcement. They vary also in how burdensome compliance is for fishermen and vesselowners. As a general rule, methods that are simpler; need less data; offer fewer opportunities for conflict between licensees and regulatory authorities; are more readily enforceable; and entail lower costs of administration, are to be preferred.

The development of the fishing industry is influenced by agencies other than the Department of Fisheries and Oceans. Federal and provincial authorities responsible for taxation, shipbuilding, transportation, fish processing, environmental quality, Indian affairs and other matters all have a significant impact on the development of the industry. Unless their activities are well coordinated, they can frustrate the objectives of licensing policy and aggravate the complexity of fisheries regulation. This obviously calls for sensitivity and close liaison among the levels of government, their departments and ministries.

The more a system depends on compelling licensees to behave contrary to their economic interests, the more complex the regulations need to be. Furthermore, a licensing technique that relies on compulsion for achieving the desired objectives is under much more strain than one that relies on private incentives. So, clearly, a licensing policy that is consistent with licensees' economic interests is preferable to one that is not.

A review of the history of licensing reveals the crucial significance of this. Attempts to control the growth of the fleet by restricting one or more dimensions of fishing power when vesselowners have strong incentives to expand capacity generate ingenious innovations to circumvent the restrictions and thereby defeat their purpose. Additional restrictions must be added to plug the loopholes. But this becomes an exceedingly difficult and costly administrative task. The likelihood that such restrictive measures will be any more successful in the future than they have been in the past is very low. Therefore, when evaluating alternative approaches, I give preference to methods that will use private incentives in constructive ways.

Evaluating Alternatives

Although other matters peculiar to particular fisheries must be considered as well, the foregoing considerations are the ones that should be used in making decisions about reforms in commercial fishing privileges. As such they provide a framework for the following evaluations of existing licensing arrangements and possible new approaches in Pacific fisheries.

Unrestricted licences Clearly, any system of fishing privileges that fails to regulate either the numbers who may fish or their individual catches is inadequate. Experience has repeatedly shown that such a licensing system fails on all of the criteria listed above: it allows fishing capacity to expand excessively, which prejudices resource management; undermines the economic security of fishermen; and eliminates scope for public revenues. Then to conserve stocks being exploited by overexpanded fleets, fishing gear, times and methods must be highly regulated, with consequent heavy administrative burdens and enforcement requirements.

Experience has also shown that even in underdeveloped fisheries unrestricted licensing can quickly be overtaken by events, making needed changes difficult. Accordingly, I propose in Chapter 10 that the remaining licences of this form should be abolished and replaced by more effective licensing arrangements.

Limited-entry licences In recent years limited-entry licences have been adopted to control fleet development, not only in the major fisheries of Canada's Pacific and Atlantic coasts, but also in the United States, Australia and a number of other countries.[15] Under this system, licences or permits convey fishing rights to a limited number of people or vessels. On the Pacific coast limited-entry licences have been applied to vessels by restricting vessel numbers, tonnage and length, and to persons by restricting the number of individuals permitted to engage vessels. Elsewhere licences have been used to restrict engine horsepower and units of gear, among other things.

This approach has a fundamental weakness: when one or more inputs in the fishing process are restricted, the capacity of the fleet can continue to expand by adding other, unrestricted inputs. As a result, this technique has consistently failed to achieve the desired results. For example, in the Pacific salmon fishery, the initial restriction on the number of vessels led to their being replaced with larger vessels. Then, in an effort to control vessel size, restrictions on tonnage and length were added. These led to further investment in new gear and vessel improvements. In the roe-herring fishery, restricting the number of persons permitted to fish has not prevented expansion of the fishing power of their vessels.

Experience in other fisheries and in other countries has been similar, though less dramatic.[16] The basic problem is that the design and structure of a fishing unit is flexible, and restrictions on one or two dimensions cannot, in the long run, prevent increased investment in other dimensions.

And while, theoretically, restrictions could be placed on all dimensions of fishing effort simultaneously, such restrictions would have to be so numerous and diverse (covering vessel size, power, crew, time spent fishing, gear for finding, catching and holding fish, and so on) that they would be virtually impossible to administer and enforce. In addition, they would preclude any technological improvements in fishing.

Governments in Canada and elsewhere have undoubtedly been attracted by the administrative simplicity of rudimentary limited-entry licensing; but because it fails to reduce or control expansion of fishing capacity, the burden of closely regulating fishing methods remains.

For these reasons, I propose in Chapter 8 that limited-entry licensing systems be replaced by more effective quota licences in those fisheries where it is feasible to do so; this includes all of the significant commercial fisheries other than the salmon and roe-herring fisheries. The existing limited-entry licences in the smaller fisheries provide a foundation on which more effective quota licensing can be built.

For the complicated salmon and roe-herring fisheries, quota licensing is not feasible, at least at present. I therefore propose in Chapter 9 improvements to the limited-entry licensing system to strengthen control of fishing capacity and to dampen incentives to invest in expansion as well as a program to reduce the excessive size of the fleets.

Quota licences Quota licences, through which individual fishermen are authorized to harvest specific quantities of fish, have attracted increasing attention and experimentation in recent years. This technique is similar to that used to regulate the use of other renewable natural resources owned by the Crown, such as timber, water, grazing rights, and so on. The government issues licences that authorize use of specific amounts of the resources, and the total amount licensed is constrained to the total recoverable yields of the resource.

Variants of this "stinting" approach have been adopted in some of the smaller fisheries on this coast and, following recommendations in this Commission's Preliminary Report, it is now being adopted for the halibut fishery. It has been introduced much more widely on Canada's Atlantic coast. While this report was being written the governments of New Zealand and Chile both announced proposals for introducing quota systems in their fisheries, as did the U.S. authorities with respect to the Alaskan halibut fishery (all, incidentally, referring to this Commission's Preliminary Report).

The outstanding advantage of this approach is that it eliminates the basic cause of overcapacity in the fishing industry by removing the incentives of individual fishermen to protect and increase their share of the catch. So, rather than encouraging fishermen to competitively and defensively increase their fishing power, it encourages them to adapt their vessels and fishing methods to take their licensed catch at the lowest cost.

This approach has other advantages as well:

i) It provides a direct means of controlling the total catch and ensuring that it will be within the sustained yield targets set for the stocks.

ii) It frees the regulatory authorities from many of the problems associated with regulating fishing activity. Some controls on fishing would obviously still be required for the biological reasons noted earlier. But, with the total catch controlled by licences, most of the restrictions on vessels, gear and fishing time that are now used to prevent overfishing would become unnecessary.

iii) It adds to the security of fishermen and eliminates much of the risk they otherwise face about their catch.

iv) It can accommodate changes in economic conditions without disruptive effects: notably, if fish prices rise or for other reasons the fishery becomes more profitable, earnings will increase, but there will not be an automatic tendency to expand fishing capacity.

v) It lends itself to a variety of methods for raising revenues in the form of licence fees and landings charges.

vi) It is, in principle at least, administratively simple. And because it deals directly with the problem of regulating the catch, once licences are issued the regulatory authorities can concentrate on resource management rather than on regulating the fleet's fishing activities.

This method does have some disadvantages: to ensure compliance with the quota, reliable information on landings is required; if a fishery is based on several stocks that require individual management, separate quotas may have to be issued for each; adjusting quotas in fisheries that depend on stocks that fluctuate widely and unpredictably is difficult. These latter problems preclude adoption of quota licences for the salmon and roe-herring fisheries.

However, as a means for regulating the catch and promoting fleet rationalization, licensing individual fishermen's quotas holds more promise than any of the other approaches described above. Wherever it has been introduced, although there have been various adjustment problems, it has substantially eased problems of resource management and reversed trends toward overcapitalization.

I therefore propose in Chapter 10 that quota systems be adopted or improved in all of the developed commercial fisheries other than salmon and roe-herring.

Mariculture leases The progression from unrestricted licensing, to limited-entry licensing, to quota licensing represents successively more clearly defined privileges granted to resource users. A further step in this progression involves issuing rights to individual fishermen or groups to the resources in a prescribed area. The rights take the form of leases; like grazing leases, trapping licences or forest management licences, they confer exclusive rights to fisheries resources over defined areas. The only examples of mariculture leases on the Pacific coast at present are those issued for shellfish by the Province of British Columbia.

This approach offers all the advantages of quotas noted above, and some additional ones as well. First, if the leases carry an appropriate term, the lease holders have a strong incentive, not only to harvest the resource in the most efficient way, but also to manage and enhance it. Under a management plan approved by the fisheries authorities, responsibilities for conservation, management and harvesting can be delegated to the lessees, as is the case under provincial grazing and forest licences. Thus, the burden of governmental administration and resource management is substantially reduced. With such rights and responsibilities, lessees have an interest in protecting the resource and the habitat from damage by others.

This approach presents certain problems, as participants in my public hearings have pointed out. It is clearly most readily applicable to stocks that are relatively immobile, such as shellfish and demersal fish. Highly migratory species would be liable to interception by fishermen outside the lease areas, and so could not be assured to the lessee. Furthermore, if the areas were large, such leases might threaten established commercial fishermen in the region or tend to create local monopolies. Significantly, however, much of the rapidly expanding salmon industry in Japan is based on fishermen's cooperatives that operate hatcheries and harvest the returning fish in particular areas.

I propose in Chapter 11 that mariculture leasing be developed for natural stocks that limit themselves to specific areas, for shellfish culture and for other forms of mariculture and ocean ranching. Developments in fish culture offer opportunities for strengthening the economic base of Indian and other coastal communities, expanded and less seasonal employment in the fisheries and a promising vehicle for more intensive management and enhancement.

CONCLUSION

In the following three chapters I build on this general framework with a view toward three broad objectives: to elevate licensing administration to a status consistent with its importance in modern fisheries policy; to advance the licensing arrangements themselves from archaic and demonstrably inadequate forms to ones that will best meet the needs and circumstances of each fishery; and to alleviate the serious problem of excess capacity which has hitherto plagued our major fisheries.

We do not of course begin with a clean slate, and reforms cannot be implemented without reference to existing policies and problems. In subsequent chapters I propose new licensing arrangements that will build on the existing systems with as little dislocation as possible.

FOOTNOTES

1. Reforming Regulation. Economic Council of Canada, Ottawa, 1981. p. 74.
2. See, for example, Journal of the Fisheries Research Board of Canada, Volume 36 No. 7, 1979.
3. Policy for Canada's Commercial Fisheries. Fisheries and Marine Service, Department of the Environment, Ottawa, May 1976. p. 39.
4. The Fisheries Association of British Columbia, Exhibit #63, p. 44.
5. Cited in G. Alex Fraser, License Limitation in the British Columbia Salmon Fishery. Fisheries and Marine Service, Environment Canada, Technical Report Series No. PAC-77-13, Vancouver, 1977. p. 1. The historical information in this section draws heavily on this publication.
6. Cited in Fraser, License Limitation. p. 3.
7. Cited in Fraser, License Limitation. p. 4.
8. Cited in Fraser, License Limitation. p. 5.
9. Sol. Sinclair, License Limitation - British Columbia. Department of Fisheries of Canada, Ottawa, 1960.
10. Press Release. Minister of Fisheries. September 6, 1968.
11. P.H. Pearse and J. Wilen, Impact of Canada's Pacific Salmon Fleet Control Program. Journal of the Fisheries Research Board of Canada, Volume 36 No. 7, 1979. p. 764-769.
12. Pacific Trollers Association, Exhibit #77, p. 24.
13. Consolidated Regulations of Canada, 1978, c. 824, as amended.
14. United Fishermen and Allied Workers' Union, Exhibit #138, p. L-1.
15. N.B. McKeller, Restrictive Licensing as a Fisheries Management Tool. White Fish Authority, Fisheries Economic Research Unit, Occasional Papers Series No. 6, Edinburgh, 1979.
16. Peter H. Pearse, Regulation of Fishing Effort. Food and Agriculture Organization of the United Nations, Technical Paper No. 197, Rome, 1980.

CHAPTER 8

A FRAMEWORK FOR COMMERCIAL LICENSING

The single most important thing to a fisherman is his license.... Fishermen are keenly aware of the importance of licensing and seek to see it controlled.

PACIFIC COAST SALMON SEINERS ASSOCIATION[1]

In this chapter I propose a general licensing policy for he commercial fisheries, capable of meeting the objecives outlined in the preceding chapter. I have already mphasized the importance of this component of fisheries olicy, which governs access to the resources and affects he way they are utilized.

The commercial fisheries account for the heaviest lemands on the stocks, and the government's failure to roperly regulate access to the resources has resulted in verexpanded fishing capacity, severe problems of esource management and poor economic performance. Because present licensing arrangements are so crude and nconsistent, and such major (and inevitably difficult) hanges are necessary, this chapter sets out in some detail a coherent licensing framework suitable for modern isheries.

THE STRUCTURE OF FISHING PRIVILEGES

Some of the fundamental questions to be dealt with in ormulating licensing policy include the activity to be icensed, the article to be licensed, the method of allocatng licences, the term of licences, transferability, and appropriate fee structures. Each of these is dealt with here.

The following three chapters address specific licensing rovisions for particular fisheries. There I propose substantially revised *limited-entry licences* for the salmon and roe-herring fisheries, *quota licences* for most of the other fisheries, and *mariculture leases* for certain shellfish aquaculture operations and ocean ranching. These general licensing forms, described briefly in the preceding chapter, call for different provisions outlined below.

Scope of Activity Licensed

The first question in the design of a licensing system is what the licence is to authorize the licensee to do. Ordinarily, a fishing licence conveys the privilege to the holder to engage in fishing; but what he may fish, where, and how are important and varying conditions. Orderly licensing calls for some general principles to be followed in this matter.

The main consideration in deciding the scope of the activity to be licensed should be the needs of resource management; so fisheries must be categorized by species, stocks or areas that have relevance for management purposes. And since harvest regulation is a central part of management, fishing privileges should be identified, as far as possible, with resource management units. From a management viewpoint, the most obvious distinctions are to be made among *species* of fish, each of which has unique characteristics regarding stock size, potential yields and susceptibility to fishing effort. Hence, my first guideline for licensing:

1. **Commercial fishing licences should be issued for each species of fish separately unless compelling technical or managerial reasons exist for authorizing fishing for two or more species under a single licence.**

Substantial progress has been made in this during the last dozen years. A commercial fishing licence initially authorized the holder to fish for everything; but first salmon, then most of the other major species, were peeled off for separate licensing. The rationale is obvious. We should not license as large a fleet for the small abalone fishery as we do for salmon, and the appropriate terms and conditions of the licences will be different also.

We are still left with one type of licence (the residual species "C" licence) that is a catch-all for a variety of minor species. The present groundfish trawl ("T" licence) also authorizes fishing for several species, some of which are fished separately and so should be licensed separately. Others are harvested together in varying proportions, and so would have to be exceptions to the general rule of separate licences for separate species. Mariculture leases might authorize management and harvesting of more than one species in the licensed area, but each would be dealt with in the supporting management plan.

Second, for the purpose of management it is necessary to recognize separate stocks of the same species, but it is virtually impossible, as a practical matter, to authorize someone to harvest one stock but not another: the stocks migrate and mingle, and the fish are not distinguishable. The practical alternative is to license fishing by *areas*, with the areas delineated in such a way as to be relevant, however imperfectly, to separate fish stocks.

The most suitable areas for licensing purposes will differ for different species. Hitherto, the basic licensing area in this region has been the whole of Canada's Pacific coast, an area defined by an accident of political history and that bears little relevance to resource management needs. The coast does divide itself conveniently into three large areas already recognized for some management purposes. I propose that these three broad zones be adopted generally to give an appropriate area definition to the fishing authorized under licences.

2. **Canada's Pacific coast should be divided into three broad zones for commercial licensing purposes: waters north of Cape Caution, the inside waters south of Cape Caution, and the waters of the west coast of Vancouver Island; I will refer to these respectively as the north, south and west zones.**

These are the areas already licensed separately for roe-herring fishing, and some tentative steps in this direction have been taken for salmon and some minor species as well. For a number of other species and stocks, allowable catches are determined according to these zones. Some fisheries will call for smaller designated areas within these zones, and mariculture leases will apply to small areas. But this general delineation of licensing zones will permit regulation of the fleets in all fisheries according to areas that have much more relevance to management than the present coastwide licences.

Third, whenever limited-entry licences are used to regulate fleets involving more than one *gear* type or sector, separate licensing of each sector is needed to allocate the catch among them and to control the capacity of the fleet. These needs do not arise in the case of quota licences, however. Accordingly —

3. **Limited-entry licences (the kind I propose in Chapter 9 for the salmon and roe-herring fisheries) should specify the type of gear that the licensee is authorized to use. Quota licences should not do so, except when needed for conservation reasons.**

Licensing by gear is already in place for the roe-herring fishery and is partially in place for the salmon fishery. I propose that the gear-specific licences in smaller fisheries be abolished with the introduction of quota licences. However, in some cases, certain gear is prohibited for conservation reasons, such as trawl gear for halibut; these restrictions should be retained.

These are the general guidelines for determining the dimensions of the activity to be authorized under a licence. By more closely identifying licences with relevant resource management units, both the calibre of fisheries management and the economics of fishing can be improved.

Article Licensed

A person, a vessel, or both can be authorized by a licence to fish; current licensing arrangements provide examples of all three. The relative merits of "licensing the man" and "licensing the boat" have been debated endlessly, and it is past time to bring some order into this matter.

First, the government should issue licences in all cases to a person or company who can be identified as the licensee, to whom notices can be sent, and who can be held responsible for paying the fees and exercising the fishing privileges in accordance with the fishing regulations. Thus —

4. **All commercial fishing licences should henceforth be issued to persons or companies.**

Second, the Department must be able to identify the vessels used by licensees, for purposes of surveillance and enforcement. Hence —

5. **All licensees should be required to designate the vessels they will use in exercising their licences, and to display on their vessels commercial fishing vessel licence plates (CFV licences) issued by the Department.**

Third, some of the existing licences (such as the original "B" salmon licences) require that the vessel be operated on the fishing grounds by a specified individual, or that the licensee be physically present on it. I see no justification for these restrictions.

Nor should a licensee be compelled to own the vessel designated for use under his licence. He should be free to employ a vessel under charter or other temporary arrangements if he chooses to do so. I therefore propose that all such restrictions be eliminated.

6. **All existing requirements that the licensee own the vessel he uses, or physically operate it, should be abolished.**

Fourth, in the case of limited-entry licences (proposed only for the salmon and roe-herring fisheries), the designated vessel must be subject to replacement regulations to control expansion of fishing capacity. These controls are dealt with in the next chapter.

Licence Term, Allocation and Renewability

As long as access to a fishery is controlled, some method of *allocation* needs to be devised to distribute the limited fishing privileges. In the past, fishermen or vessels established in the fishery at the inception of a new licensing program were "grandfathered in" in some fashion. That is, those who were already involved in the fishery were allocated the privileges to continue to do so. Others were disqualified. Because this method minimizes dislocation, and fairly recognizes established interests, I support it on these grounds.

The following two chapters contain specific recommendations for all commercial fisheries governing the transition from the present licensing arrangements to the new framework proposed in this chapter. With a few exceptions, I will propose that existing licensees be grandfathered in for periods long enough for the new system to take full effect. But once a satisfactory licensing program is in place, the allocation procedures for commercial licences should be designed so that eligibility is open to everyone on the same basis.

The *term* of fishing privileges deserves much more attention than it has received. Hitherto, all licences have carried a term of not more than one year. While an annual licence might be adequate when access to a fishery is unrestricted, when it is limited such a short term offers very little security to fishermen and vesselowners unless it is automatically renewable. My review of the history of restrictive licensing during the past decade suggests that licensees were indeed encouraged to believe their fishing privileges would be renewed indefinitely, and this has led to awkward problems in reducing licence holdings in overcrowded fisheries. If it is automatically renewable, the term is, in effect, perpetual, and the Crown has very little room to adjust licence policies and holdings over time as conditions change.

Furthermore, under any new programs involving mariculture leases, lessees must be assured of access to the resource for a predictable and sufficiently long period of time to allow them to plan effectively and make needed investments to properly manage the resource.

Reform of the licensing system should therefore include provisions for definite, longer terms for fishing privileges, as are provided in licences to most other natural resources. A term consistent with normal planning periods for depreciation of investments would improve the security of licensees and also provide predictable times when the government could modify the privileges granted.

The following set of recommendations on licence allocation, term and renewability offers most fishing enterprises much greater security than they now have under annual licences, provides the government with the flexibility it needs to change the number of fishing privileges as conditions change without interfering with legal or implied commitments, and maintains opportunities for new entrants.

7. **Limited-entry licences and quota licences should have terms of 10 years.**

8. **The terms of mariculture leases should be determined individually for each in recognition of the characteristics of the fishery, the amount of any capital investment required for enhancement and the life cycle of the species.**

In allocating licences, the first step is to determine how many should be available. Therefore —

9. **For each limited-entry fishery, the government should determine and periodically revise the fleet capacity desired in each gear category for each licensing area. One-tenth of that capacity by gear category should be available for allocation each year.**

10. **For quota fisheries, the government should calculate and periodically revise the total allowable catch; one-tenth of the total allowable catch should be allocated under new quota licences each year.**

Next, I propose that, except for the initial allocations to established licensees, competitive bidding procedures be adopted to allocate the total capacity for limited-entry fisheries and the total allowable catch for quota fisheries.

11. **To allocate new 10-year limited-entry and quota licences for each fishery in one of the three licensing zones or smaller areas where they will apply, the Department should call for bids.**
    - **i) Bids should be in writing and should be delivered in sealed envelopes by a prescribed date.**
    - **ii) When all bids are in hand at the prescribed date, they should be opened in public and ranked from the highest offer to the lowest for each licence category. Working downward from the highest bid, licences should be awarded until all to be allocated that year have been absorbed. The lowest bid accepted by this method should determine the amount to be paid by all successful applicants. Any ties between competing bids for the last units allocated should be resolved by a draw.**
    - **iii) The terms of the 10-year licences should begin the year following their award.**

12. **During the first 10 years (the transitional period described in Chapters 9 and 10), only holders of licences that recognize established positions in the fisheries should be eligible to bid for new licences. Thereafter anyone should be eligible.**

13. **For new limited-entry salmon and roe-herring licences the following provisions should be made:**
    - **i) The licence should authorize the licensee to fish for salmon or roe-herring with specified gear, with a vessel of the authorized capacity and, where applicable, in a particular zone.**

ii) Bids for licences should specify a single gear to be authorized by the licence (gillnet or seine for roe-herring; gillnet, seine or troll for salmon) and, where applicable, a particular zone.

iii) Except for roe-herring gillnet licences, bids should be expressed in dollars per ton of vessel capacity applied for, to be paid each year during the term of the licence. Bids for roe-herring gillnet licences should simply authorize the use of one vessel without reference to its size.

14. For new quota licences —

i) The licence should authorize the harvest of a specified quantity of the relevant species in the particular zone, each year for the term of the licence.

ii) Bids should be expressed in dollars per unit of quota, to be paid each year during the term of the licence.

iii) Subject to the limits on control recommended later in this chapter, bidders should be free to bid for any quantity of quota they wish following the transitional period.

15. Mariculture leases should be allocated and periodically reallocated according to competitive bidding procedures unless the land area that forms the geographical base for the tenure is controlled by the applicant and thus is not open to management by anyone else.

The 10-year quota licences should be used to systematically allocate the total allowable catch of quota fisheries, to the extent that allowable catches are predictable over time. However, there should also be the means for allocating additional quantities of fish that become available temporarily as a result of natural phenomena or past underutilization.

16. The Department should be authorized to issue short-term quota permits for allocating temporarily harvestable surpluses in quota fisheries.

Where feasible, quota permits should be allocated according to competitive bidding, but in any event the permit holder should be required to pay royalties at rates recommended later in this chapter.

Finally, initial allocations of quotas may sometimes exceed the allowable catch in a fishery, or because of natural phenomena the abundance of a stock may decline. The Department must be able to reduce quota allocations in these circumstances.

17. The Department should have the authority to reduce quotas *pro rata* when necessary to reconcile them with the total allowable catch in a fishery.

Under these proposals, one-tenth of the desired total licences in each fishery will be issued by competition each year, one year before their terms begin so that successful and unsuccessful bidders alike can plan accordingly. If, as time goes on, the Department finds that the outstanding licences are either excessive or insufficient, it should alter appropriately the quantities of new licences issued, spreading the adjustment over the years.

Several significant advantages flow from the proposed licensing arrangements. First, existing fishermen will enjoy greater security and certainty about their fishing privileges under long-term licences. Allocating new licences one year in advance of the beginning of their term will further facilitate advanced planning. Second, after a transitional period, newcomers will be able to enter the fisheries by dealing directly with the government instead of having to purchase a licence from someone else. Third, the Department will have unprecedented opportunities to adjust access to the fisheries continuously as needs change. Fourth, allocations through competitive bidding is an objective means for determining who will have access to scarce and valuable public resources and will ensure that, through time, licences are exercised by those who can make the best use of them. All the successful bidders in each competition will pay the same amount per unit for their fishing privileges. Furthermore, through competitive bidding, some of the surplus value generated in a rationalized fishery will be returned to the public treasury instead of being absorbed into licence values and appropriated by the original licensees as they have been in the past.

As recommended in Chapters 9 and 10, the proposed bidding procedures will not apply to initial allocations to established licensees, since they will be grandfathered into the new licensing system, and only they will be eligible to compete for new licences during the transitional period.

Landings Requirements

Most of the existing licences are automatically renewable so long as the licensee has landed fish in the preceding year or two. The provisions vary considerably without apparent logic: most salmon licences qualify for renewal if the vessel has recorded as little as one fish landed during the previous two years; while a residual species ("C") licence holder, who fishes much less valuable stocks, must show at least $500 in landings at least every other licence year.

These conditions are directed against idle licence holders, but their effect is mainly to induce all licensees to fish in order to protect their rights. In addition, such provisions encourage false landings reports in order to maintain fishing privileges when they are not being exercised. Thus, whenever fishing licences are valuable or even potentially valuable, very few are not renewed. I see little to be gained from provisions that effectively force all licensees to fish when the main problem is too large a fishing fleet.

18. All landings requirements for licence renewal should be abolished immediately.

For quota licences, I propose below that royalties be payable on the resources committed to licensees whether the authorized catch is taken or not. This will provide adequate assurance against unused allocations.

Transferability of Licences

Probably the most controversial issue in licensing is that of transferability. To begin to sort out the often confusing debate over this question, a couple of distinctions should be made. First, whether a licence is transferable is often confused with whether the licence is applied to a person or a boat. This confusion may have arisen because the Department has attempted, unsuccessfully, to reduce the size of some fleets (e.g. the roe-herring) through attrition by issuing licences to persons and making them nontransferable. But a licence applied to a person can be made transferable if the government wishes to do so.

Second, a distinction should be made between transferring a licence from one person to another and transferring a licence from one vessel to another. The latter is related to vessel replacement. The former involves the sale of fishing privileges, often in conjunction with the sale of a vessel; it is regarding such transactions that the term transferable properly applies.

The controversy surrounding transferability involves several questions: whether it permits private parties to gain from the sale of rights to use a public resource, whether it will encourage overcapitalization of the fleet, whether it will lead to monopoly control, and whether it invites speculation that causes destabilizing fluctuations in the value of licences. These concerns deserve brief comment.

First, we must recognize that a licence to fish in any remunerative limited-entry fishery will be valuable. This value cannot simply be swept away by making licences nontransferable. If transfers are prohibited, a licence holder will be unable to sell his fishing privilege to someone else, but he can still realize the value it confers on him by catching fish and selling them. So the value that a licence confers on its holder cannot be erased by prohibiting him from shifting the privilege to another person.

This Commission's terms of reference imply that the Crown should extract the economic gains from the fishery beyond a reasonable return to fishermen and vesselowners, but prohibiting licence transfers is not the best way to do this. Charges for fishing privileges afford a more direct and equitable method.

The anxiety about private profits and capital gains from rights to use public resources is misdirected when it focuses on licence transferability. If the objective is to improve the economic returns of fishing and, at the same time, to prevent the financial benefits from accruing only to private parties, then ways must be found to divert the gains to the public. Licence fees and landings charges can serve this purpose while prohibiting licence transfers cannot. And by reducing the profitability of fishing, direct public levies on licensees also reduces the market value of their fishing privileges. Moreover, if licences have fixed terms and are reallocated periodically through competitive bidding as recommended, new entrants can acquire them directly from the government, without driving up the price of licences held by others.

The concern that licence transferability aggravates overcapitalization of the fishing fleets seems to be unfounded as well. A vesselowner will add to the catching power of his boat whenever he expects that the costs of the extra equipment will be at least covered by the higher volume or value of catch it will produce. His expectations about this will not be affected by whether or not his licence is transferable. When a fishermen buys a licence from someone else to place on his vessel (which has occurred frequently in past years), his capital investment certainly includes the cost of both the vessel and the licence. But when economists refer to overcapitalzation of fishing fleets and associated costs, the cost of a licence is irrelevant because it does not represent investment of tangible capital that could be employed elsewhere in the economy. So the cost of excess vessel capacity is a waste of resources, but licence value is not.

Finally, concern that speculation artificially inflates licence values appears to be largely exaggerated. Most transactions in vessels and licences are among fishermen and fishing companies. While some have undoubtedly gained from trading in licences and vessels, the fluctuations in value have reflected mainly the changing expectations of fishermen and vesselowners themselves about the economic returns from fishing and their financial circumstances. (Apparently, other investors have been attracted to invest in fishing vessels and licences as a tax shelter, but this is a separate issue, discussed in Chapter 13.)

While the objections to transferability are weak, its benefits are substantial. Transferability permits flexible reallocation of fishing privileges to enable the industry to adjust and to provide an avenue for new participants.[2] It will be particularly valuable in promoting fleet rationalization where licences provide catch quotas because it will enable licensees to adjust their rights to the most economical amount for their fishing units. The more flexibly the quotas can be divided and combined, the more they will encourage this kind of rationalization. And in some of our most overcrowded fisheries, the initial quotas will sometimes be uneconomically small, so the opportunity to combine them is imperative to improve economic performance.

Were transfers prohibited, a fisherman who wanted to withdraw from the fishery during the term of his licence would not be able to do so without losing the value of his (unlicensed) vessel and gear as well; this would impose excessive hardship on those who become incapacitated through old age or illness. Special rules could be invoked to permit transfers to next of kin or partners, but this would simply amount to a form of constrained transferability.

Finally, prohibiting transfers is extremely difficult. Experience has shown that restrictions can be circumvented through legal manoeuvers involving changes in company shareholdings, leases, trusts and so on, which simply raise the costs of effecting transfers.

The only valid objection to licence transferability lies in the threat of monopolization or concentration of fishing rights. This should be dealt with by means of simple but strict rules that fix a limit to the number of privileges that any person or company may hold an interest in, as recommended later in this chapter.

With this protection, and with a system of fees that ensures that the public will receive the value of the resources used in excess of a reasonable return to fishermen and vesselowners, transferability should be permitted. Accordingly, I make the following recommendations:

19. **Subject to specific limits recommended below, all limited-entry and quota licences should be freely transferable from person to person. Quota licences should be transferable in whole or in part and, for this purpose, quotas should be denominated in units for each species.**

20. **Mariculture leases should be transferable only with the consent of the Minister.**

Under current regulations most licences can be transferred with the licensed vessel, subject to the approval of the minister, which is rarely withheld. My proposals would make transfers simpler and more flexible, requiring ministerial consent only in the case of mariculture leases where the government needs the assurance that transferees will be able to carry out the contracted management responsibilities.

21. **Licence transfers should be required to be reported to the Department within 15 days.**

This reporting requirement is necessary to enable the Department to effectively monitor the fisheries and enforce the limits on licence holdings.

Combining and Dividing Licences

Earlier in this chapter I recommend that licences be specific to species, to defined areas and, in limited-entry fisheries, to gear sectors as well. This does not imply that the number of licences a licensee may hold should be restricted, apart from certain general limits on the total holdings of individual licensees proposed below. Indeed, several advantages can result from licensees and their vessels engaging in more than one fishery. Employing vessels, equipment and crews in a variety of complementary fisheries presents opportunities for substantial economies in capital, insurance and other fixed costs as well as longer employment for fishermen. Moreover, holders of limited-entry licences, by combining licences to fish two or more species, in two or more areas, or with a second gear, can spread their opportunities. In conjunction with the vessel replacement rules, this will have the beneficial effect of reducing the number of vessels in the fleets. I therefore recommend that —

22. **Licensees should not be restricted in acquiring licences to fish or using their vessels to fish more than one species, area or gear. However, transfers of limited-entry licences should be subject to vessel replacement controls (described in Chapter 9).**

Within a particular limited-entry fishery, holders of combination licences that authorize using more than one gear or fishing in more than one area should not be permitted to separate them; to do so would allow additional vessels to enter the fleets. Thus —

23. **Holders of licences for more than one gear type or area on the same designated vessel in the same limited-entry fishery should be prohibited from separately transferring one without the other. Beyond this, restrictions against "splitting" licences should be abolished.**

This restriction will apply mainly to combination licences authorizing troll and gillnet gear in the salmon fishery. Separating licences for separate fisheries need not be restricted because this will not add to the licensed capacity in either. And in the case of quota fisheries, transfers of quota will not threaten to increase vessel capacity in any event.

Limits on Licence Holdings

In the interest of maintaining a vigorous and competitive fishing industry, undue concentration or monopolization of fishing privileges should be forestalled. Provisions to limit the licence holdings of individual persons or corporations may be particularly desirable in the face of a eet-reduction program and the introduction of quota cences in which established licensees are given priority new licence allocation.

The appropriate limit on holdings should be deter-ined primarily with reference to the scale of operations equired to support an efficient fishing unit and the total ize of the fishery. Thus, in general, the limit for large isheries should be a smaller share of the total licences han for small fisheries. Accordingly, I recommend hat —

4. No person or corporation should be eligible to obtain a limited-entry licence through a transfer or new licence allocation if it would result in the person or corporation controlling more than five percent of all licences, by number, for that species.

5. No person or corporation should be eligible to obtain a quota licence for a major quota fishery through a licence transfer or new licence allocation if it would result in the person or corporation controlling more than five percent of the total allowable catch of the fishery.

For these purposes, "major quota fishery" includes halibut, sablefish and groundfish.

26. The limit for all other quota fisheries should be fixed at 15 percent unless the level of catch sufficient to support an efficient fishing unit indicates that another level would be more appropriate.

27. When a licensee's holdings exceed these limits at the inception of these new licensing arrangements, he should be eligible to retain his holdings at the higher level but not to increase them further. If any such licensee subsequently reduces his holdings, he should not be eligible to increase them again except up to the prescribed limit.

28. These limits on licence holdings, and the requirement to report transfers recommended above, should apply to fishing privileges "or any beneficial or other interest" in them, so that trusts, leases and related arrangements cannot be used to circumvent the limits. The limits should also apply to the transfer of shares of incorporated licensees that would change the control of the licence, quota or lease.

For these purposes, "beneficial interest" and "control" should be defined in the regulations. And the holdings of corporations, their shareholders, subsidiaries and affiliates should be pooled to ensure that the limits are not circumvented by corporate manipulations.

These provisions should not apply to licensees who use their fishing privileges as a security under bona fide financing arrangements, such as a bank or processing company. That is, a mortgage or pledge should not be regarded as a transfer. If a financier forecloses, but is ineligible to take control of the rights under the limits outlined above, he should be required to dispose of them within a specified period. This provision will enable fishermen to obtain needed financing, but will prevent anyone from expanding his foothold in the fishery through loan defaults.

My Preliminary Report suggested another restriction on licence transfers to processing companies to replace the existing informal limit of 13.2 percent on the number of salmon licences to be held by members of the Fisheries Association of British Columbia. The restriction suggested there will now be unnecessary since my proposals above will ensure that processing companies now holding substantial fishing privileges will be prevented from increasing their shares. At the same time, these arrangements will permit the formation of fishermen's cooperatives or other ventures involving processing as long as they stay within the proposed limits. In any event, the holdings of fishing privileges by processing companies is diminishing, as I explain in Chapter 13. The Department should monitor these holdings to ensure that the present trends are not reversed.

These proposals are generally consistent with the policy of the Government of British Columbia regarding fish buyers and processors.

> The spirit and intent of new policy directing the issuance of processing plant and fish buyers' licences is to promote competition and economic efficiency within the buying-processing sector. . . .[3]

An explicit set of regulations of the kind proposed will go a long way towards clarifying governmental policy regarding the fishery's structural development and will assure fishermen that new changes in policy will not result in greater concentrations of power in the industry.

Royalties

For too long the revenues from commercial fisheries on the Pacific coast have been pumped into wasteful expansion of catching capacity, while at the same time the Canadian public has shouldered heavy expenditures for administering and managing these resources. The token $2.5 million realized from licence fees in the Pacific region in 1981 is paltry compared to the $85 million budgeted for managing, administering and enhancing the resource and in relation to the potential economic returns under rationalized fishing. A realistic portion of revenues derived from commercial fisheries should now be directed away from excess catching capacity toward recouping these costs to the public, reducing bloated fleets and enhancing the resource.

At present, annual licence fees are the only direct source of government revenue generated from commercial fisheries. A licence fee is an appropriate way to realize some of the value of a privilege to use public resources. It is also the simplest way for the government to recover for the public some of the "economic rents" in the fisheries and to help defray administrative costs. But the government should not rely exclusively on licence fees. Differences in flat rate fees among species and among gear types are bound to be arbitrary and will not accurately reflect the values of various species over time. Thus, they will fail to ensure that the charges "are consistent with the value of the resources recovered" as the Commission's terms of reference suggest they should. And flat rates are inequitable because they tend to put the heaviest burden on those who catch the fewest fish. So licence fees should at least be supplemented by other charges that reflect more accurately the value of the resources used.

In recent years recurrent discussions have occurred and recommendations have been made regarding levies on the catch, or royalties, as a means of generating revenue from the fisheries. The Minister's advisory committee on salmon fleet development advised in 1973 that —

> . . . since a licence fee based on vessel tonnage does not adequately reflect catching ability or the use of the resource, the Committee recommends that required revenues for fleet rationalization be raised primarily through payments based on actual landings.[4]

In 1978 a special advisor to the Department of Fisheries and Oceans recommended a royalty for the Pacific fisheries to discourage further investment in fishing capacity.[5] In April 1980, in the Speech from the Throne, the government pledged itself to new revenue arrangements for the fisheries. More recently, in October 1980, special advisors to the Minister of Fisheries and Oceans recommended royalties on salmon, and the Minister announced his intention to implement that recommendation in 1982 if circumstances were suitable. A landings fee has also been considered as a means of recovering the cost of the Salmonid Enhancement Program. Such levies have already been introduced in the neighbouring fisheries of Washington State and Alaska.

My Preliminary Report last year urged the government to introduce royalties without further delay, and recommended specific rates and other details. Early this year the Minister again announced his intention to implement royalties on salmon for the 1982 season, but at the time of writing this report with the fishing season half over, the enabling legislation has still not been introduced into Parliament.

Some participants in my public hearings and meetings opposed royalties on grounds that public revenues are raised through the tax system. But the tax system is a general method of exacting a contribution to government costs from all personal and business income, irrespective of any raw material used to produce it. Business enterprises that do not rely on public resources still pay their share of taxes, so taxes cannot be viewed as the price paid for access to public resources.

In order to return to the public a share of the value of public resources used by private parties, a royalty must be levied. Such charges are customary in Canada for timber, furs, minerals, oil and gas, and there is no obvious reason to exempt highly valuable fish. If royalties were coupled with fleet reduction and (for some species) stock enhancement, they would, in the end, improve the earnings of vesselowners and fishermen. Indeed, without additional charges, these programs will bestow windfall gains on the industry and would prompt additional fishing capacity.

Finally, although depressed fish prices now plague some sectors of the industry, experience suggests that wide cyclical swings in prices and earnings can be expected. Certainly, the prosperous salmon and roe-herring markets of the mid and late 1970s could have supported significant royalties even though the capacity of those fleets was excessive. The rapidly escalating values of vessel licences over that era is testimony to this conclusion.

Despite the misgivings of some, many fishermen, vesselowners and processors accept the need to raise public revenue from the fisheries and recognize royalties on landings as the most appropriate means. They are clearly the most direct and equitable means of charging for the use of fish resources, and they ensure that payments to the government are related consistently to resource use, as the Commission's terms of reference suggest they should. I therefore make the following recommendations:

29. **Each year, holders of quota licences and mariculture leases should be required to pay royalties on their authorized catch at the rates for each species set out in Table 8-1. These charges should be payable whether or not a quota licensee actually catches his entitlement, in recognition of the resources reserved for each licensee.**

30. **Royalties should be applied to all future landings of salmon and roe-herring at the rates set out in Table 8-1. These charges should be collected from those who buy fish from fishermen.**

The proposed royalties are intended to apply to the round weight of salmon landed. A simple fraction of the landed weight should be added for dressed fish to approximate the round weight equivalent.

Table 8-1 Proposed fees and royalties for vessel licences and quotas

annual commercial fishing vessel licence (all fisheries)	$50
salmon royalties	
chinook, coho and sockeye	10¢ per pound
pink and chum salmon and steelhead trout	5¢ per pound
roe-herring royalties	$50 per ton
royalties for quota fisheries	
halibut	10¢ per pound
sablefish	$250 per ton[a]
food and bait herring	$ 50 per ton
rockfish	$ 30 per ton
hake, pollock and dogfish	$ 10 per ton
other groundfish	$ 15 per ton
shrimp	10¢ per pound
prawns	20¢ per pound
crabs	10¢ per pound
herring spawn-on-kelp	80¢ per pound
abalone	25¢ per pound
geoducks	5¢ per pound
tuna	5¢ per pound
other species	variable[b]

[a] Based on dressed weight.

[b] Royalties should be approximately 10 percent of the landed value.

The rates have been expressed in dollars rather than as a percentage of the landed value as recommended by some. The reasons for this include simplicity, consistency and enforceability. (The price of fish varies during the season and is sometimes embodied in post-season bonus payments and other considerations that do not provide a consistent basis for a percentage levy. Specific rates eliminate opportunities to evade the charges through such arrangements.) But most importantly, it ensures that the minimum charge for a particular category of fish is the same for everyone. A fisherman who dresses his fish and handles them well often receives a considerably higher price than others landing the same kind of fish. A royalty in the form of a percentage of the landed value would discriminate against the former, who generates the highest value from the resources he uses.

The indicated rates are the same as those I proposed in my Preliminary Report for salmon, steelhead, halibut and abalone. They are meant to apply in the first year only; the long-term policy should be to adjust them as conditions change. However, those who compete for long-term licences must be reasonably assured about how much the royalties will be. I therefore propose:

31. **The long-term policy should be to maintain royalty rates between 5 and 10 percent of the gross value of the landed fish, and at least one year's notice should be given for any changes.**

The year's notice is the minimum reasonable forewarning of changes in these levies.

Royalties will add to the administrative burden of the Department but they will also produce significant revenue. The main new requirement will be more accurate statistical information on landings than is now available from fish sales slips. These data are required for management purposes as well, as I describe in Chapter 4. Certain changes to the Fisheries Act will be required to supplement the existing provisions for reporting landings; I understand that these have been formulated for deliberation by Parliament for some time.

The Government of British Columbia has taken steps to strengthen its regulatory control and information on related matters. A recent policy statement pledges the Minister of Environment to undertake these responsibilities:

> Development of an improved Licensing, Administration, Inspection Enforcement capability, coupled with a new policy analysis and development role for the Marine Resources Branch, will provide for an effective monitoring role and the ability to influence federal policy direction.[6]

Statistical reporting systems for purposes of royalty administration should therefore be developed in close liaison with the provincial authorities.

In normal circumstances the opportunities for evasion will be minimized by the fact that royalties will be based on landings receipts, a copy of which is provided to each fisherman and forms the basis of payment for his catch. In some cases, however, commercial fishermen sell fish directly to consumers or restaurants, and this should be provided for. The legislative amendments should make the fisherman responsible for remitting the royalties in such cases. This is consistent with the Province of British Columbia's intent that "fishermen who sell directly to the consumer will be required to have a buyer's licence and to accurately record and report all sales."[7]

Under quota licences, royalties will be payable independently of actual catches, so the administrative burden of assessing them will be much lighter than under restricted-entry licences. In these fisheries, accurate reporting of landings will be required to ensure that quotas are not exceeded.

Licence Fees

At present, fees payable range from no charge for a food-herring permit to $2,000 for a roe-herring seine licence. In the salmon fishery, fees range from $20 for an Indian licence to $800 for an ordinary licence for a large seiner (see Table 7-1). In addition to these individual species fees, all vessels are required to validate commercial fishing vessel (CFV) plates at a cost of $10 annually.

I have concluded that the commercial licence fees should be restructured, with uniform annual fees for all fisheries to offset the costs of administering the licensing program. I therefore recommend —

32. **The annual validation fee for the general commercial fishing vessel licence (CFV licence) should be $50 for all vessels and all additional fees now charged for annual validation of individual species privileges should be eliminated.**

In effect, the proposal would spread licensing administration costs evenly over the entire commercial fleet, while leaving it to royalties and bids for new licences to capture an appropriate share of resource values for the public.

Payments

These proposals will increase licensees' financial obligations, which will consist of the annual commercial fishing vessel licence validation fee, royalties and bonuses bid for new licences. I propose that —

33. **One half of the annual payments due in respect of royalties on quota licences and mariculture leases and bonuses bid for all new licences and leases should be payable each year at the time of validation of commercial fishing vessel licences. The other half should be payable by December 31.**

34. **Interest should be charged on all payments in arrears, and licences and leases should not be validated until arrears are paid.**

Postponing half the payments until the end of the year in this way will lighten the financial burden on licensees prior to the fishing season.

To conclude this section, I stress that this reformed structure of licence fees and royalties must be introduced at the same time as other important licensing proposals in this report. If the new fishing privileges and fleet rationalization are not accompanied by provisions for capturing some of the benefits, windfall gains will accrue to licensees and become capitalized into licence values, making it more difficult to introduce new charges in future.

A NEW APPROACH TO FLEET DEVELOPMENT AND LICENSING ADMINISTRATION

With the introduction of limited-entry licensing in the major fisheries during the last few years, licensing administration and fleet development have emerged from passive and relatively unimportant concerns of the Department to major issues of fisheries policy. Moreover, the policies themselves have been changing rapidly and licensing has become increasingly elaborate, so that the administrative demands on the Department have grown considerably. But the provisions for attending to these matters have not kept pace; and the importance of licensing has clearly outgrown the priority it receives in the region.

Licensing administration remains a separate unit in the Management Services Division of the Field Services Branch. Its responsibilities include issuing the full range of commercial licences initially and renewing them annually, documenting licence transfers and approving vessel replacements. Buried deep in the Field Services Branch, licensing competes for funds and stature with the full range of field operations in the region.

Elevating Licensing Responsibilities

Licensing differs markedly in substance from most other functions performed by the Department. The main thrust of the Department's activities are biological and engineering: determining the condition of the stocks, developing them, and managing fishing and fish habitat. Licensing, in contrast, is concerned with industrial development and the allocation of rights of access to resources. Even under today's system, strong arguments can be made in favour of divorcing the licensing function from traditional fisheries management activities, since it calls for an entirely different kind of expertise and it deals with quite different problems, including the highly sensitive business of allocating fishing privileges. Licensing administration by no means enjoys universal confidence now:

> . . . licensing decisions have created suspicion and resentment in the industry; this has contributed to further animosity between fishermen and those charged with managing the fishery.[8]

These functions will be even more important under the licensing proposals in this report. Allocating new licences and administering competitive bidding must be, and must be seen to be, independent and totally impartial; and managing fleet rationalization programs calls for special organizational arrangements.

The Economic Council of Canada, in a recent study of fisheries policy, concluded that fishing privileges should be administered by a body that is separate from the agency responsible for managing the resources, because "fishery officials should be as insulated as possible from decisions about who is to participate, so as to depersonalize and depoliticize the choice of gear and fishermen."[9] Separate licensing authorities already exist in Alaska, New Zealand, and some other jurisdictions, and appear to operate well. It is worth noting also that some of the highly regarded fisheries management agencies are free of licensing responsibilities, such as the International North Pacific Salmon Commission, the International Halibut Commission and Alaska's Department of Fish and Game.

In my Preliminary Report I recommended a Crown corporation to administer a buy-back program in the salmon and roe-herring fleets. This would be a separate entity from the Department of Fisheries and Oceans and would be guided by a board of directors appointed from industry as well as government.

Since then, I have concluded that licensing administration in the Pacific region should be clearly separated from fisheries management and elevated to a level commensurate with its importance under a separate agency. This licensing function would neatly complement the responsibilities of the proposed corporation. Both would be heavily involved in fleet development through the licensing medium, they would have common needs for basic information about the size and structure of the various limited-entry fishing fleets, and the activities of both would be closely linked through the transitional period recommended in Chapter 9 for rationalizing the salmon and roe-herring fleets.

I therefore propose that all of these functions be combined into a single agency, with responsibility for all aspects of fisheries licensing and fleet development:

35. A Pacific Fisheries Licensing Board should be created under legislation as a Crown corporation.

The board should be given responsibility for administering commercial fishing licences within the general policy set out in the Fisheries Act and regulations, and should be responsible to the Minister for ensuring that licensing policy is applied uniformly and consistently. It should be responsible for conducting competitions for new licences, carrying out the licence retirement program (recommended in Chapter 9), maintaining a public record of licence holdings, deciding licence appeals, and advising the Department on needed changes in licensing policy.

The board members should be appointed mainly for their experience in the fishing industry or related fields, though to avoid conflicts of interest none should be actively involved in the industry while serving on the board. At least one member should be an official of the Department of Fisheries and Oceans. Nongovernment members should be part time and should be paid for the time they spend on board business.

36. A full-time executive director should be appointed by the board to oversee its day-to-day operations and to decide initially all questions that arise concerning commercial licences. He should be responsible to the board and have sufficient staff and facilities to carry out the board's responsibilities.

Licensing Appeals

When judgments must be made about an applicant's eligibility for obtaining a licence or replacing a vessel, some kind of appeal mechanism is needed. Also, because withholding a licence can have major consequences for an individual's livelihood, a variety of special circumstances can arise that deserve consideration. For these reasons, the Department has evolved an appeal system over recent years.

When a fisherman or vesselowner applies to the licensing section of the Department for a licence, transfer, replacement or some other matter relating to licensing, and his application does not meet the licensing regulations, he is given a written rejection with the reasons for the denial. He may then pursue the matter by writing to the Vessel Licence Appeal Committee, explaining why he thinks he should be exempted from the relevant provisions in the regulations. The chairman of this committee is a Departmental licence appeals officer who devotes full time to this task and handles routine cases without further referral.

Unusual or controversial cases are referred to the full committee, consisting of the chairman and two other public servants. The committee reviews decisions made by the licensing section, considering any new information that may have become available and referring to past decisions. If the committee has any doubt about the appropriate decision, it denies the appeal and informs the applicant of his right to appeal to the Pacific Region Licence Appeal Board.

This appeal board is largely independent of the Department. All six members are appointed by the Minister; the one Department employee on the board serves as chairman and secretary but does not vote on decisions. Four are retired fishermen with broad knowledge of commercial fishing, and the other is selected for his general knowledge of the fishing industry. The board meets in Vancouver one or two days each month.

Applications for appeal to the Licence Appeal Board are submitted in writing, and applicants are encouraged to appear in person before the board. After the appellant presents his case, the board deliberates and sends its decision to the Minister with the details of the appeal. The Minister, finally, considers the case and the board's recommendation. He may request more information from the board, or ask it to reconsider its decision, but in most cases he accepts the recommendation and informs the appellant of his decision.

The grounds for appeal are set out in some detail in the Pacific Fishing Registration and Licensing Regulations; they refer to late applications for reasons beyond the control of the applicant, injury, industrial disputes and acts of God among other things. In 1981 the appeal board considered 160 appeals, about half of which were approved and half denied.

When a new limited-entry licensing system is introduced, a temporary special appeal committee is usually struck to deal with the typically numerous applications from fishermen who fail to qualify under the regulations but feel they are entitled to a licence. These special committees are chaired by the chairman of the Vessel Licence Appeal Committee, and they usually operate within well-established guidelines. Applicants who are denied their appeals by a special committee may apply further to the appeal board.

Many fishermen are cynical about, and distrustful of, this elaborate appeal system. These feelings appear to result from unnecessarily secretive aspects of the appeal process. The grounds on which appeals are made are never disclosed, nor is the board's rationale for approving them. So, even though an approval may be entirely appropriate, outsiders have no basis for assessing this. In the circumstances of the fisheries, where the granting of licences affects not only those who receive them, but also indirectly the welfare of all the other fishermen who may be competing for the same catch, this arrangement is bound to cause discontent. Finally, it is questionable whether two levels of appeal are required and whether, in light of experience, the Minister needs to retain the power to make final decisions.

I have concluded that the existing structures and procedures for appealing decisions relating to licensing are unnecessarily cumbersome, and therefore make the following recommendations:

37. **The Pacific Fisheries Licensing Board should hear all appeals from decisions of its executive director concerning licensing, and decisions of the board should be final and binding.**

38. **Appeals to the Minister of Fisheries should be discontinued.**

39. **The presentation of all appeals to the board and all board decisions should be open to the public.**

Other responsibilities of the board relating to fleet rationalization are described in the following chapter.

Conclusion

The policies the industry now lives under have grown like topsy over the past decade; hard lessons have been learned from this experience, and it is now time for a comprehensive and systematic licensing system that will provide the means of meeting today's challenges.

The recommendations in this chapter are wide ranging. As a package they are intended to introduce a licensing framework that will modernize the methods of allocating fishing privileges, meet the government's commitments to existing licence holders and, at the same time, provide the means to cope with the urgent problem of fleet rationalization. The proposed system will also advance other objectives of public policy relating to allocating rights, transfers, concentration of holdings, payments to the public treasury and ancilliary administrative arrangements.

The three succeeding chapters address specific policies for licensing individual fisheries and rationalizing fishing for the future. There I recommend specific steps for making the transition from present arrangements to the new licensing system. The salmon and roe-herring fisheries are dealt with in Chapter 9, all other commercial species in Chapter 10, and opportunities in mariculture and ocean ranching are discussed in Chapter 11.

FOOTNOTES

1. Pacific Coast Salmon Seiners Association, Exhibit #76, p. 22.
2. Reforming Regulation. Economic Council of Canada, Ottawa, 1981. Chapter 7.
3. Commercial Fisheries and Mariculture: A Policy for the 1980's. Ministry of Environment, Victoria, (undated). p. 6.
4. West Coast Salmon Fleet Development Committee Report. Fisheries and Marine Service, Department of the Environment, Vancouver, April, 1973. p. 8.
5. Sol. Sinclair, A Licensing and Fee System for the Coastal Fisheries of British Columbia. Department of Fisheries and Oceans, Vancouver, December, 1978. Volume I, p. 290-293.
6. Commercial Fisheries and Mariculture. p. 14.
7. Commercial Fisheries and Mariculture. p. 6.
8. New Democratic Party, Exhibit #136, p. 2.
9. The Public Regulation of Commercial Fisheries in Canada. Economic Council of Canada, Ottawa, 1981. p. 45. See also Reforming Regulation. p. 77.

CHAPTER 9

RATIONALIZING THE SALMON AND ROE-HERRING FISHERIES

> *...the one clear point is that if there were fewer vessels exploiting the resource, the economic returns to those remaining in the industry would be increased and from the management point of view, the chances of severely depressing or wiping out a stock entirely by over-fishing, would be reduced.*
>
> THE FISHERIES ASSOCIATION OF B.C.[1]

This and the following chapter reveal a history of failure to provide regulatory policies that will promote orderly development of the fishing fleets. In fishery after fishery, measures to control excessive expansion of fishing capacity have been introduced too late, or ineptly. The result is too large a fleet for the available catch. The pressure on the stocks is excessive and the economic returns to fishing are depressed. Nowhere is this failure of policy more evident than in our two biggest fisheries, salmon and roe-herring. Because they are our two dominant fisheries, and because they are so closely linked, I deal with them together in this chapter, leaving all the other commercial fisheries to the chapter following.

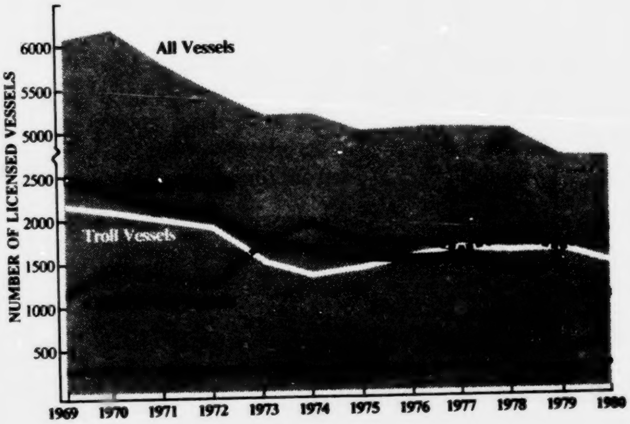
At the time of this inquiry, the fisheries have been particularly depressed by weak international markets, modest runs of fish, exceptionally high interest rates and escalating fuel costs, among other things. While these pressures are serious in themselves, they also aggravate the much more fundamental and longer-term problem of excess fleet capacity. The causes of this excess capacity are much more directly in the hands of the fisheries authorities, and because of it a temporary weakening in market conditions causes severe adversity.

To understand these fisheries' problems and my recommendations for solving them requires understanding why, given that the value of salmon and roe-herring catches has risen substantially over the last decade, the returns to fishing have not also risen. The answer is that the cost of fishing has increased, not just because the prices of labour and capital have risen as they have everywhere, but also because the fishing fleets have expanded unproductively. This reflects the general tendency — explained in the preceding chapter — of common-property fisheries to overexpand harvesting capacity. The catches, now spread over grossly oversized fleets, must bear the cost of all the excess capacity. This is a result of faulty regulatory policy. And the policy that has encouraged, or at least permitted, this to happen will also allow any future gains from enhanced resources or higher prices to be dissipated in further redundant fleet expansion. This chapter therefore recommends fundamental changes to reverse these trends.

THE SALMON FISHERIES

The salmon fleet's size and structure, and its technical sophistication, have changed significantly in recent years, so that it is now among the world's most advanced small-boat fleets. Of particular interest are the changes that have taken place since limited-entry licensing was introduced to control unwarranted expansion of the salmon fleet in 1969. As shown in Figure 9-1, the number of vessels in the salmon fleet has declined fairly steadily since then. By 1980 only 4707 vessels were reporting salmon landings compared to 6104 in 1969. (Note that these figures refer to the number of vessels that reported landings. The number of vessels licensed is somewhat higher.)

Figure 9-1 Composition of the salmon fleet



Sources: For years prior to 1975, G. Alex Fraser, License Limitation in the British Columbia Salmon Fishery; for later years, unpublished data from the Department of Fisheries and Oceans.

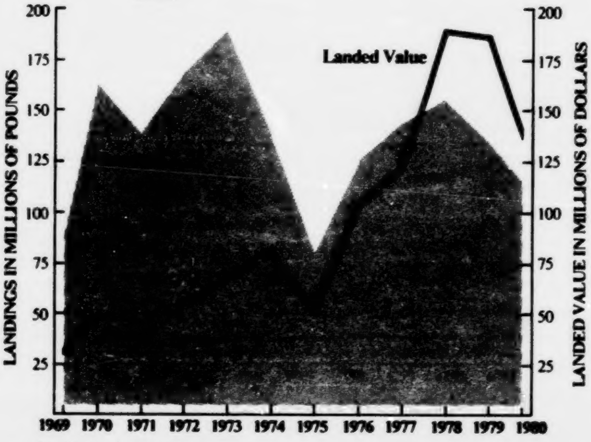
The composition of the fleet has changed as well. The number of seine vessels fishing only for salmon has increased from 286 in 1969 to 316 in 1980. The full increase in the number of seine vessels is not revealed in Figure 9-1, however, because many fish for roe-herring as well as salmon and are therefore included in the combination category. The number of these combination seine vessels has increased from 83 in 1969 to 216 in 1980. The growth of the seine fleet has resulted from vessels being transferred from the halibut fleet, from gillnet and troll vessels converting into seiners, and from new vessels being added from the Indian "tonnage bank."

The numbers of gillnetters and trollers declined, mainly from their being converted to seine vessels (which involved "pyramiding" the licensed capacity into fewer, larger vessels), but also from their being withdrawn through the buy-back program between 1971 and 1974. However, the declines are not as great as indicated in Figure 9-1 because an increasing number of vessels carry both types of gear and hence are included in the combination category. This has resulted from increased restrictions on net fishing, which have induced many gillnet vesselowners to add troll gear over the years in order to expand their fishing opportunities.

Landings and Earnings

Figure 9-2 illustrates the changing volume and value of commercial landings since 1969. Salmon prices have risen considerably over this period, and so the value of landings shows a much stronger upward trend than the landed weight. However, prices and volume of landings have fluctuated widely, making the salmon fishery particularly unstable.

Figure 9-2 Landings and landed value of salmon since 1969



[a] including bonus payments.

Sources: Fisheries Statistics of British Columbia. Department of Fisheries and Oceans, Vancouver, various years. Bonus payments of 1977 from P. H. Pearse and J. E. Wilen, Impact of Canada's Salmon Fleet Control Program. Journal of the Fisheries Research Board of Canada, Volume 36 No. 7. 1979. p. 766; for later years, bonus payments estimated by Commission staff.

Table 9-1 shows the number of vessels and value of salmon landed in each sector of the fleet in 1980. The combination sector clearly dominates. The year 1980 was one of low earnings with the total value of salmon landed falling to $133 million from $187 million in 1979.

Table 9-1 Structure of the salmon fleet and value of landings by gear type in 1980

gear type	number of vessels reporting landings	landed value of salmon[a] (millions of dollars)
gillnet	1065	14.2
troll	1493	32.6
seine	316	28.2
combination[b]	1833	58.3
total	4707	133.3

[a] Includes estimated bonuses.

[b] Includes all vessels that fished with more than one type of gear for salmon and all salmon vessels that engaged in other fisheries as well.

Source: Vessel numbers and landings compiled from unpublished data from the Department of Fisheries and Oceans.

Table 9-2 shows the average gross earnings of vessels in 1980 in each of the gear sectors. Because these are average earnings, they disguise a wide variation in earnings among vessels in each sector.

In order to indicate the total earnings of vessels in the salmon fleet, Table 9-2 shows not only the value of salmon landed but also the value of other species landed by salmon vessels. The importance of other species (particularly roe-herring) has increased in recent years and is especially marked for the seine sector, which landed nearly as much value in other species as it did in salmon in 1980.

Table 9-2 Average earnings of salmon vessels in 1980

	vessels fishing salmon only	vessels fishing salmon and other species		
		salmon	other species	all vessels
gillnet	$12,750	$20,970	$ 2,060	$18,665
troll	21,000	24,700	12,720	22,500
seine	84,940	97,150	62,500	115,280
all vessels	$24,980	$30,300	$10,200	$31,000

Source: Based on unpublished data from the Department of Fisheries and Oceans.

Earnings vary considerably among the sectors of the fleet for three reasons: the average capacity of vessels in each gear category varies; the several species of salmon differ in value and in their susceptibility to particular types of gear; and the same species caught by different gear types can differ in value.

Ownership

The ownership of the salmon fleet is widely dispersed. The larger processing companies maintain fleets of their own; other companies involved in fishing own several vessels each; but most of the fleet is owned by individual vesselowners.

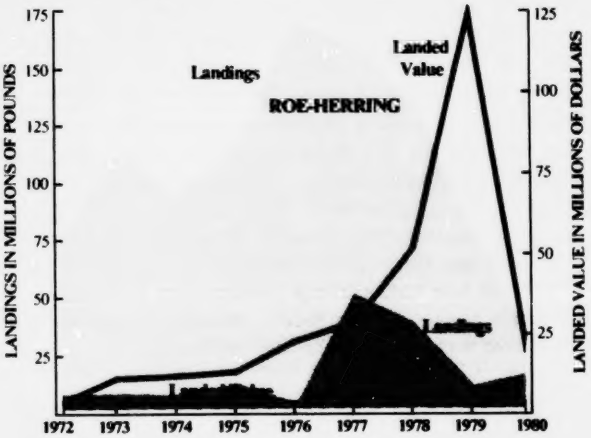
When limited-entry licensing was introduced into the salmon fishery in 1969, processing companies that comprised the membership of the British Columbia Fisheries Association owned 13.2 percent of all salmon vessels. The companies were advised by the Minister that they would not be permitted to exceed this proportion and, as the total number of licensed vessels was reduced, they would have to reduce their fleet in proportion. Through sales of vessels and the pyramiding of smaller vessels into larger seine vessels in the years that followed, the number and proportion of vessels owned by processors declined, and in 1981 was slightly more than 11 percent of the number of licensed salmon vessels.

These numbers refer only to vessels wholly owned by processing companies; they do not include vessels in which processors have a partial equity or other financial interest such as a mortgage. From the point of view of public policy, the important issue is the extent to which such arrangements are used to "tie" vesselowners and thereby lessen the competition for fish. Significantly, in recent years, vesselowners appear to have become less dependent on processing companies for financial support, and the companies have preferred to withdraw from financial commitments to fishermen, so that the control of the fleet by processors has almost certainly declined. This year, the largest company, British Columbia Packers Limited, began to divest itself of some of its fleet (see Chapter 12), and it appears that the trend toward diminishing control of the fleet by processors is continuing.

THE ROE-HERRING FISHERY

Figure 9-3 illustrates the history of wide fluctuations in roe-herring harvests and shows the recent trends in landed value. As indicated in that figure, earnings in the roe-herring fishery have been extremely volatile. In the record year of 1979 when total landed value reached $125 million, gillnet vessels averaged gross earnings of $50 thousand and seine vessels about $268 thousand, but as in the salmon fishery, a wide range exists around these averages. The "herring bonanza" of the 1970s was associated with strong markets for roe in Japan. In 1980, a weak market, compounded by a fishermen's strike, caused landed values to decline to $24 million. Landings were considerably higher in 1981 and 1982, but prices have stabilized at lower levels. In 1981 the landed value was $33 million and a preliminary estimate places the value of 1982 landings at $29 million.

Figure 9-3 Landings and landed value of herring since 1972



Sources: Fisheries Statistics of British Columbia. Department of Fisheries and Oceans, Vancouver, various years.

EVOLUTION OF THE LICENCE SYSTEM

The salmon and roe-herring licence systems were the earliest of the limited-entry licences introduced and are particularly complicated. This section sketches their historical development and present structure.

Salmon Licensing

The pioneering scheme for the salmon fishery was the Davis Plan, which was announced in 1968 as —

> Measures to increase the earning power of British Columbia salmon fishermen and to permit more effective management of the salmon resource by controlling the entry of fishing vessels into the fishery. . . .[2]

Background This program's evolution since it was introduced is described in other publications, and so will be summarized only briefly here.[3]

The first step was an attempt to freeze the fleet. All vessels that had recorded landings of 10 thousand pounds of pink or chum salmon or the equivalent in other salmon species in either of the two preceding fishing seasons were declared eligible for "A" licences (referred to here as "ordinary" salmon licences). These licences were applied to the vessel, they were transferable with the vessel, and the licensed vessel could be replaced. Vessels that had recorded salmon landings of less than the qualifying amount were awarded "B" licences at a reduced fee; these vessels could not be replaced (and are therefore referred to here as "temporary" licences). No new licences were to be issued.

The scheme was highly controversial and, in response to pressures, the government made a number of concessions that had the effect of weakening the freeze on the fleet. The most important of these relaxed the requirement for salmon landings: vessels that had landed any species equivalent in value to the 10 thousand pounds of pink or chum salmon (approximately $1,250 worth of fish) were eligible for ordinary salmon licences. Thus, about 160 additional vessels, including 60 halibut vessels and 40 trawlers, were added to the licensed salmon fleet, and more licences were awarded as a result of appeals. The result was that the fishing capacity licensed to fish for salmon was considerably greater than any capacity previously engaged in the fishery, though the purpose of the scheme was to prevent further expansion.[4]

Several special arrangements were made for Indians. In 1971, any Indian with an ordinary licence could convert it to a new subcategory of Indian licences ("A I" licences), which carried lower fees but eliminated the opportunity to participate in the buy-back program introduced at that time. Indians with temporary licences were permitted to convert them to Indian licences in 1973. Until recently, these Indian licences could be transferred freely only between status Indians, but if the accumulated difference in fees between the ordinary and Indian licences were paid, the licences could be renewed as ordinary licences and transferred to non-Indians. As the value of ordinary licences rose over the years, many Indian licences were transferred to non-Indians in this way. In an effort to prevent further decline in Indian participation in the commercial fisheries, conversions and sales of Indian licences to non-Indians were prohibited in 1980.

At the time of writing, there were 162 temporary salmon licences whose evolution is complicated. In 1970 the Minister announced that all of these licences would be renewed only until 1978, then they would be eliminated. When that term expired for the original licensees (referred to as "original B's"), the 103 vessels remaining in this category were granted an additional five years to 1983. These extensions were granted on conditions that the vessels continued to be operated by the original licensee, that they landed salmon every year, and that the licence privilege could not be transferred. At the time of writing, 87 licences remained in this category, all of which are due to expire on December 31, 1983.

Over the years, some holders of ordinary licences chose to replace them with temporary licences with a limited life of 10 years from the date of conversion. There are presently 27 of these "downgraded B" licences; 24 of them will expire on December 31, 1983, and the rest by December 31, 1988.

The remaining 48 temporary licences fall into the "appeal B" category. Many of these are held by fishermen who acquired B licences, from either "original B" or "downgraded B" licensees, with full knowledge of their special conditions and limited terms. Most of these 'appeal B' licences expire at the end of 1983. Also included in this category are 14 licences held by Indians who acquired temporary licences since 1973, and were granted indefinite terms, subject to annual review.

In May, 1971 a short-lived buy-back program was initiated to eliminate some of the excess fleet. To provide funds for this purpose, licence fees for ordinary licences were doubled. (Those for temporary and Indian licences were not, on the grounds that these vessels were not to be eligible for purchase under the buy-back program.)

It soon became clear that limiting the number of vessels was not adequate to control expansion of fishing capacity because licensed vessels were replaced by larger vessels — often several times larger — and capital continued to be invested in more efficient vessels and equipment. In an attempt to forestall this, rules were adopted that restricted replacements to vessels of no greater length or tonnage than the vessel being retired ("foot-for-foot" and "ton-for-ton" replacement rules). Later, the freedom to combine licensed tonnage from two or more vessels into a single larger vessel ("pyramiding") was prohibited. Nonetheless, as the value of salmon rose, investment in vessels and equipment continued, and the fishing capacity of the fleet expanded further.

While the number of licensed vessels in the salmon fleet has declined from more than 6100 in 1969 to 4171 ordinary, 376 Indian, and 192 temporary licences in 1981 (as shown in Table 7-1), the capacity of the fleet has grown substantially; the capital invested is probably several times greater now than when the fleet-control program was introduced, and because of technological advances, the fleet's catching power has increased even more. All of this costly increase in fishing capacity has been redundant as it contributes nothing to the catch.

Current licensing arrangements All forms of salmon fishing privileges are simply limited-entry licences since they authorize a vessel to engage in salmon fishing and catch an unlimited quantity of fish. All of the present licences are issued to vessels, though, in effect, some of the temporary forms license a person as well because they prohibit replacement of the vessel, unless it is lost, and require that it be operated continuously by the owner originally licensed. The restrictions on the "appeal B" licences held by Indians are rather unclear insofar as the vessels are sometimes operated by another member of the Indian licensee's family.

Salmon licences are renewable annually provided that commercial landings of some fish are recorded at least every second year (one fish is sufficient). The exception is the "original B" licences for which landings must be recorded every year. Temporary licences can be renewed only for a limited period (though the ultimate life of "appeal B" licences is unclear). An ordinary licence can at any time be converted to a temporary licence at the option of the licensee.

Several restrictions apply to the gear that may be used. In 1977 a moratorium on new seine vessels was imposed, although it has not been altogether effective. In 1981, a form of area licensing for troll vessels was introduced that required each licensee to elect to fish either inside or outside the Strait of Georgia; those that choose the Strait are restricted in their freedom to use other gear.

The annual fee, payable upon renewal of licences, varies with licence category as follows:

ordinary licences	
vessels less than 30 feet (9.14 m)	$200
vessels greater than 30 feet (9.14 m) but less than 15 tons (42.45 m^3)	$400
vessels greater than 15 tons (42.45 m^3)	$800
Indian licences	$ 20
temporary licences	$ 20

Ordinary licences are transferred automatically with the vessel; other transfers can be made only with the consent of the Minister. Indian licences are now transferable only among status Indians. "Downgraded B" and "appeal B" licences are transferable, but "original B" licences are not.

Replacement rules The provisions for replacing licensed vessels are as follows. Ordinary and Indian licensed vessels may be replaced upon the prior approval of the Director General (or, failing that, the approval of the Minister on appeal), subject to foot-for-foot and ton-for-ton replacement restrictions. That is, a replacement vessel must not exceed the vessel replaced in terms of either length or tonnage. As mentioned, temporary licences do not permit the vessel to be replaced. Finally, a new seine vessel can be introduced only if another seine vessel is retired.

Despite the Department's efforts to tighten the rules since vessel replacements were first restricted, serious problems remain. The most fundamental of these calls into question the adequacy of using hold capacity and length as reliable measures of vessel fishing power. A comprehensive measure of fishing capacity would include a host of other contributing factors, such as engine power, hull design, electronic apparatus and power devices for deploying gear. But, as I explained in Chapter 7, simultaneous restrictions on all the dimensions of fishing power would be virtually impossible to administer and enforce.

Even the present ton-for-ton and foot-for-foot replacement rules, which apply to only a couple of the fishing capacity dimensions, are difficult to enforce. First, 85 percent of all salmon vessels have a capacity of less than 15 tons and are therefore not required to be surveyed under ship's registry requirements of the Department of Transport. So the Department can only apply the foot-for-foot restriction. Second, when an unregistered vessel is replaced by a registered vessel, the Department relies on a length-to-tonnage conversion table. Because the length of a vessel is only one factor among many that determine its tonnage, the relationships in this table are somewhat arbitrary.

Third, even for registered vessels, net tonnage is an unreliable indicator of hold capacity, since it includes other elements of interior vessel space as well. Marine architects can design a vessel to meet tonnage constraints while increasing hold capacity. Furthermore, classifying space in the hold inevitably involves subjective judgements. Thus, a replacement vessel can, in fact, have a greater hold capacity than that of the replaced vessel even though their surveyed net tonnages are the same.

These weaknesses in fishing vessel replacement rules are serious, since they fail to limit the physical size of the fleet. Nor do they prevent new capital investment in vessel improvements, gear and equipment. Thus, they have done little to alleviate the salmon fishery's fundamental economic problem.

Buy-back operations When the salmon fleet control program was introduced in 1969, restrictive licensing was intended to control further expansion of the fleet. Subsequently, a short-lived buy-back scheme was introduced in 1971 to reduce the fleet by purchasing and retiring vessels with ordinary licences. Funds were to be provided by licence fees, which were doubled specifically for this purpose (except temporary and Indian licences, since these vessels were not to be eligible for purchase under the buy-back program).

A special buy-back committee, consisting of Departmental personnel and industry representatives, was struck to carry out the buy-back operation. During the ensuing three years, 362 vessels were purchased, stripped of their licences, and resold at auction under a covenant that prohibited them from engaging further in commercial fishing on Canada's Pacific coast. Some $6 million was spent on acquiring vessels during this period; of this, $3.4 million came from licence revenues and $2.6 million from resale of vessels at auction.

Between 1972 and 1974 the market value of salmon licences increased dramatically from about $250 per licensed ton to roughly $7,000. Although buy-back purchases were said to drive up these prices, the main cause was undoubtedly the bumper harvests and record prices for salmon and roe-herring, which produced unprecedented incomes and overoptimistic expectations. At the same time, the funds generated from licence fees remained unchanged, so that the rise in licence values severely diluted the purchasing power of the revenues.

After 1974, no more vessels were purchased for seven years, though the increased licence fees continued to be levied. Then, early in 1981, following new recommendations to the Minister, the program was reactivated. The proposal called for funding through a grant of $10 million (roughly equivalent to the accumulated fees intended for this purpose plus interest) and through a further increase in licence fees. In the end, only $2.9 million was allocated for this purpose, and its expenditure was limited to the remainder of the 1980-81 fiscal year.

With these meagre funds, and only six weeks to expend them, the Department endeavoured to discourage frivolous applications for boat sales by requiring a $100 application fee from any owner who sought an offer for his vessel. Nevertheless, some 350 applications were received — far more than could be purchased or even appraised in the time available. By the end of the fiscal year, 26 vessels were purchased at a cost of $2.5 million. The vessels were left tied up for seven months near Vancouver and inevitably deteriorated. They were finally auctioned by the Crown Assets Development Corporation in a very weak market for about $660 thousand. Since early 1981, buy-back operations have again been suspended, apparently pending the recommendations of this Commission.

Roe-herring Licensing

The roe-herring industry began in 1972 after herring stocks had partially recovered from a collapse in the 1960s and the Japanese market for roe became accessible to Canadian producers. The mature fish are harvested by seine and gillnet vessels in a brief spring season when the roe is ripe and the fish are about to spawn.

This new, lucrative fishery developed with startling rapidity, attracting large numbers of vessels, and in 1974 the government attempted to control the fleet's expansion by restricting the fishery to those who obtained licences in that year. Anyone could obtain a licence, but to discourage applicants, an unprecedented annual fee of $2,000 was levied for a seine licence and $200 for a gillnet licence, though Indian licences in both categories were issued for $10. The Department's goal was to issue 150 seine and 450 gillnet licences, but this was greatly exceeded: 270 seine and 1,400 gillnet licences were issued initially, far in excess of the capacity required to harvest the available catch.

The roe-herring ("H") licence, in contrast to the salmon licence, is issued to persons rather than vessels. The licensee must designate the vessel to be used, but the designated vessel can be changed from year to year without restriction on size. The Department, by administrative practice, requires that the licensee have one-third interest in a designated gillnet skiff and 25 percent in a designated seine vessel. But Indian licences must be exercised by Indians. All licences are technically nontransferable. They must be renewed every year by January 15th, but fish do not have to be landed to qualify for licence renewal. In 1981, as Table 7-1 indicates, 1293 gillnet and 243 seine licences were issued.

The roe-herring licensing system has given rise to several serious problems. The first and most obvious is that it failed to curtail the size of the fleet to the needed capacity. This was due partly to generous initial eligibility criteria, partly to the fact that Indian licences continued to be issued without limit until 1977, and partly to the fact that in 1974, when restrictions were introduced, those who had previously engaged in roe-herring fishing could obtain a second licence, and nearly all did so. Furthermore, only those licences issued in 1974 to first-time participants were required to be exercised by the licensee; those previously were not. Because of the difficulty of enforcing two sets of regulations, this licensee-operator rule was abandoned in 1979.

By making licences nontransferable and requiring that licences be exercised by licensees on vessels in which they have ownership, the Department originally intended to reduce the number of licence holders as they retired or died. However, it found that prohibiting transfers to a deceased licensee's spouse or next of kin was difficult, so the nontransferability rule has been relaxed in these cases. And, as these fishing privileges have become more valuable, ways of legally circumventing the nontransferability rule have been found by way of leases and trust holdings of the licensees' vessels. Thus, the licences are effectively transferable, though at some inconvenience and cost.

Furthermore, because the licences apply to persons, who can change their designated vessels, there is little to restrain the growth in fishing power of the vessels used and hence the expansion of the fleet's fishing capacity. In this respect the licensing system has been even less effective than salmon licences, being incapable of controlling the fleet size, which is its main purpose.

The roe-herring fishery is extraordinarily hectic due to the unpredictable stocks and available catch, the massive and excessive fishing power, the need to limit the fishing time to the moment when the fish are about to spawn and the high values at stake. It is probably the most difficult of fisheries to manage; fishery officers, under extreme pressure and great uncertainty, have to try to restrict openings to a few minutes in many cases, during which fortunes have sometimes been made.

Success in regulating the catch has been mixed at best. Harvesting targets have been exceeded in many cases, and in others the fishery officers have been reluctant to declare openings because the fishing power of the fleet is so great it would threaten to decimate the stocks. And the Department's attempt to divide the catch between the seine and gillnet sectors in prescribed proportions, described below, has failed to even approximate the targets.

In attempting to make the fleet more manageable, various restrictions have been tried. In 1980, the permitted net length for the gillnet fleet, where excess capacity is most extreme, was halved. Last year, a system of area licensing was introduced. The coast was divided into three areas, corresponding to the north, south and west zones I proposed in the preceding chapter, and each roe-herring licensee was required to choose one area in which his licence would apply. This has the effect of spreading the fishing power of the fleet and limiting the number of vessels that can converge on a particular opening. After two seasons' experience, opinions about the advantages of area licensing vary, but the Department and a majority of fishermen agree that this made the fishery more manageable, enabled improvements in stock utilization and lowered the fleet's operating costs. It has done nothing to reduce the fleet's overall excess capacity, however.

This year, a number of seine vesselowners acquired licences from other fishermen to fish in a second area. This had the beneficial effect of reducing the roe-herring fleet by one vessel whenever two licences were combined, and the policy of facilitating this process was consistent with recommendations in my Preliminary Report. However, opposition to fleet reduction at a time of economic recession and high unemployment led to a temporary suspension of further licence combinations after some 23 licensees had acquired more than one licence.

The roe-herring fishery has had a significant impact on the development of the salmon fleet. Seine vessels that fish roe-herring typically fish salmon as well, and high earnings in roe-herring during the 1970s fueled investment in vessels used in both fisheries. In the herring fishery, hold capacity is a much more important constraint on the fishing capacity of a vessel, and this has stimulated the introduction of larger vessels into the salmon fishery as well.

LICENSING POLICY AND PROPOSALS

To come to grips with the structural problems of these fisheries and to design policies that will enable the industry to perform more efficiently, as my terms of reference direct, has been this Commission's most formidable challenge. The importance of this task is hard to overestimate. My public hearings have revealed that present circumstances and trends are unsatisfactory to everyone in the industry: fishermen, vesselowners and processors, as well as the regulatory authorities. They are a threat to resource conservation and management and to recreational and Indian fishing interests. And they are a frustration to other Canadians, who watch the wealth in these exceptionally valuable resources being squandered in wasteful and destructive fishing effort.

Yet the size and complexity of these two fisheries leaves them very intractable. In the next chapter I recommend certain straightforward changes involving catch quotas for certain smaller fisheries that will enable them to be rationalized fairly simply, but those solutions are not practical for the salmon and roe-herring fisheries.

At the present time, any system of individual catch quotas would, in my judgement, be difficult for these fleets to adjust to and probably beyond the capability of the Department to administer. The stocks and available catch of these species are notorious for their wide and unpredictable year-to-year fluctuations, making it impossible to allocate individual quotas in advance with any degree of certainty.

This sets the salmon and roe-herring fisheries apart from the other commercial fisheries in this report. Because they cannot now be reorganized under a more advanced form of licensing, I propose special measures to improve the limited-entry licences and to reduce the fleets. The solutions are therefore more complicated than those I recommend for the other fisheries. But on the basis of all the information and advice I have received, they seem to me to afford the most effective and equitable means of redirecting the development of these two most important fisheries.

The kind of policy changes required to reverse the adverse trends in the salmon and roe-herring fisheries will inevitably be difficult, controversial and costly. My detailed proposals in this chapter constitute a package of several related components for restructuring licensing and fleet-development policy for the salmon and roe-herring fisheries. They include —

i) Changes in the form of licences to harmonize the salmon and roe-herring licensing systems along the lines set out in the preceding chapter. These changes will bring more order to the licensing arrangements, improve the security of licensees and provide better means of controlling fleet development.

ii) A fleet-reduction program to reduce the salmon and roe-herring fleets to half their present size over a 10-year period. This is aimed at improving the economic performance of the industry and alleviating pressures on the natural resources by facilitating adequate provisions for escapements.

iii) A policy of allocating the catch among competing sectors of each fleet to ensure that all will share in the benefits of fleet rationalization.

iv) Provisions for royalties on landings to capture some of the financial gains from fleet rationalization.

v) New restrictions on vessel replacement, which — coupled with levying royalties and eliminating subsidies recommended in Chapter 13 — will dampen licensees' incentives to expand their fishing power.

Throughout, these major changes are designed to minimize dislocation of established fishermen and vesselowners, to preserve opportunities to enter the fisheries and to ensure that the costs and benefits of change will be equitably shared.

Experience suggests that recommendations for changing fisheries should be detailed; otherwise uncertainties generate resistance to reform. For this reason my proposals are more detailed than is common for commissions of this kind.

As required by my terms of reference, my Preliminary Report contained a number of proposals for reforming licensing arrangements and other policies affecting fleet development, most of which are incorporated into the more comprehensive program recommended in this chapter. In making the interim recommendations in my Preliminary Report I left certain matters to be dealt with in this final report, leaving a range of options open. Subsequently, the Minister announced that, while he intended to adopt some of the Commission's other recommendations, action on these proposals for the salmon and roe-herring fisheries would be postponed until he had received my final report. In the meantime, I have had helpful commentary from participants in the public hearings on both the preliminary recommendations and the issues I left for later resolution.

The specific proposals in the remainder of this chapter conform to the general framework for licensing policy developed in the preceding chapter.

Licence Specifications

In Chapter 8, I explained that a commercial fishing licence should authorize the holder to fish for a particular species in a defined area and, where relevant, with a specified type of gear. In addition, it should be issued for a term of 10 years. Within limits, licences should be transferable and new licences should be issued through competitive bidding. The proposals that follow provide the means of transforming the existing licences for salmon and roe-herring to incorporate these principles and at the same time to reduce the fleets.

Initial licences While new limited-entry licences should be allocated in future through competition, for the reasons I explained in Chapter 8, those who already hold licences should be grandfathered into new fishing privileges, with the proposed longer terms. Thus —

1. **All existing ordinary and Indian salmon licences and roe-herring licences should be replaced in 1983 by new licences having 10-year terms.**

Most temporary salmon licences already carry definite terms, and these should not be altered. The "original B" licensees, particularly, have made strong representations for extending their privileges further,[5] but by 1983 they will have had 5 years' extension beyond the original 10-year terms. In view of the crucial need to reduce the excessive number of outstanding licences I cannot recommend that they be extended further, especially in light of my concern to persuade the government to set fixed terms on other licences and assure all fishermen that (in contrast to past performance) all terms will be rigorously adhered to. Thus —

2. **The existing temporary ("B") salmon licences should be renewed until the year in which they are scheduled to expire, then eliminated.**

This will mean that 87 "original B" temporary licences will expire at the end of 1983, the 27 "downgraded B's" and 34 of the 48 "appeal B" licences will expire in various years by 1988.

This leaves the 14 "appeal B" licences held by Indians, the term of which is subject to annual review. These terms are the most unsatisfactory of all, having never been fixed at 10 years like other licences and implying at least the possibility of indefinite extensions one year at a time. I therefore recommend that —

3. **Appeal "B" salmon licences held by Indians should be replaced in 1983 by new licences having 10-year terms, on the condition that they continue to be exercised by the present licensees.**

By adopting this schedule, the status of the temporary licences will be clarified and all will be eliminated within a few years. In the meantime, all temporary licensees should be eligible to bid for new licences during the transitional period (recommended later in this chapter) as long as their current licences are in effect. Like anyone else, they would also be eligible to bid after the transitional period.

In Chapter 8 I recommended that all licences should be issued to persons or companies, and that they should designate the vessel to be used. In these two limited-entry fisheries, the designated vessels must be subject to replacement rules to control fleet expansion. Neither of the present licensing systems meet these requirements:

salmon licences restrict vessel replacements, but are not issued to persons; roe-herring licences are issued to persons, but do not restrict vessel replacements. These deficiencies should be corrected, and the inconsistencies between the two licence systems eliminated in all new licences issued. Hence —

4. **Each initial 10-year salmon licence issued in 1983 should identify as the licensee, the person or company that owns the vessel now licensed. The vessel should be the licensee's designated vessel, subject to replacement regulations.**

5. **Each initial 10-year roe-herring licence issued in 1983 should designate a vessel, chosen by the licensee, to be used by him in exercising his licence and to be subject to replacement regulations.**

Thus, in future, the two licensing systems will be harmonized; licences in both cases will designate the licensee's vessel and all vessels can be replaced only according to the replacement rules recommended later in this chapter.

Gear licensing Currently, roe-herring licences specify that either seine or gillnet gear is to be employed by the licensee. In the salmon fishery, only seine gear has been specifically limited; a moratorium was invoked in 1977 to prohibit any additional seine gear from entering the fishery, but ways have been found to circumvent this restriction. Apart from these restrictions and those on other gear applied to Gulf trollers referred to earlier, vessels with salmon licences have been free to use troll, gillnet or seine gear or any combination of these. Control over the addition of new types of gear on vessels and the switching from one gear to another is essential in order to limit the capacity of the fleet. To this end, I make the following recommendations:

6. **The present seine and gillnet gear specifications in roe-herring licences should be retained.**

7. **Comprehensive gear licensing should be introduced to supplement the existing salmon licensing system. To accomplish this, all salmon licences issued in 1983 should specify the gear to be used by the licensee, according to the following criteria:**

    i) **Where the vessel has landed 90 percent or more of its salmon catch, by weight, using one gear type during either 1980 or 1981, the licence should specify only that gear henceforth.**

    ii) **Licences that apply to combination vessels that have landed more than 10 percent of their salmon catch with gillnet and more than 10 percent with troll gear, in both 1980 and 1981, should henceforth authorize the licensee to use either or both of these gears for the term of the licence.**

These rules for eligibility for initial combination licences should not restrict new combinations of gear, however. By allowing licensees to combine gear on vessels (which may well be efficient units in certain circumstances) they will also reduce the total number of vessels and thereby promote fleet rationalization. Thus —

    iii) **Subject to the vessel replacement rules, licensees should not be restricted in acquiring from other licensees the privilege to use another type of gear on their vessels.**

Anyone who receives a licence for more than one gear, either by qualifying for a combination licence initially or later through an acquisition, should not be permitted to split them by transferring the right to use one of the gears while retaining the other. That would give the initial combination licensees an unreasonable advantage and, as explained in the preceding chapter, would permit more vessels to enter the fishery. This implies that combination licences (referring to licences authorizing more than one gear to fish a particular species, not licences for different fisheries) must be maintained as such.

Catch allocation Unquestionably, the most sensitive issue in fisheries regulation is how the available catch is to be allocated among competing groups. In the roe-herring fishery two groups compete: the gillnetters and the seiners. In the salmon fishery, there are more: the gillnetters, seiners, trollers, sport fishermen and Indian food fishermen, as well as subsidiary groups like combination gear vesselowners and charterboat operators. Each group, knowing that the total catch must be limited, focuses attention on its *share*. This is the source of the gear wars, and the endless debates, generously evidenced in testimony at this Commission's hearings, about which user group is more legitimate or has a stronger claim.

The Department has no explicit legislative authority to allocate the available catch among users. But it has, in effect, been doing so for years: allocation is an inevitable consequence of regulating openings and closures and restricting gear. The Department even has a target for dividing the roe-herring catch between the seine and gillnet fleets. But it has never attempted to allocate the salmon catch according to any explicit formula.

A lively discussion has occurred in recent years about the desirability of allocating the commercial salmon catch among the sectors of the fleet. This issue is related to gear licensing, and not surprisingly small groups (especially those who see their position in the industry as particularly threatened) support gear licensing only on the condition that the catch allocation be fixed also. Three years ago the Pacific Region Fisheries Management Advisory Council established a committee to advise on this matter. After lengthy deliberations, the committee was unable to reconcile the strongly conflicting positions of the three gear sectors in the commercial salmon fishery and therefore could not agree upon specific recommendations in its 1980 report.[6]

For the roe-herring fishery, the Department has ostensibly aspired during the last 4 years to allocate 55 percent of the catch to the seine fleet and 45 percent to the gillnet fleet. But the managers of this fishery have never been able to provide so high a percentage to the seine sector, mainly because finding stocks in the required condition and available for seining is often difficult. Each sector's share has been closer to half in recent years.

In my Preliminary Report I reported that in spite of much support among fishermen who testified at my hearings for catch allocation, I was not prepared, at that time, to recommend that the Department prescribe the share to be taken by each sector of the fleet, though I would reconsider the matter in my final report. In the meantime, I proposed only that the Department attempt to maintain roughly the allocations that have been achieved in recent years, leaving open opportunities for change in the light of fleet rationalization and other events.

My hesitations at the time of writing my Preliminary Report reflected, in part, a concern that we could not say how salmon could best be harvested in the long term after the fleets were rationalized, and that a catch allocation formula might well lock in a pattern of harvesting that would soon become obsolete yet difficult to change. More importantly, I was concerned that catch allocation was unmanageable. Advocates of the policy underestimate, in my judgement, the difficulty of apportioning the catch among the gear sectors in these two fisheries according to prescribed targets, and I was not prepared to recommend a policy that might well be impossible to implement effectively and that could aggravate friction between the industry and the Department.

Experience in the roe-herring fishery has demonstrated the Department's inability to meet such targets where there is only one species and two sectors of the fleet. For the salmon fishery, with three gear sectors, a large number of combination vessels, and five major species of fish all of differing values and susceptibilities to particular gear, the problems would be magnified considerably.

Since writing my Preliminary Report, I have had an opportunity to discuss this question further with fishermen and others. I remain convinced that the Department cannot be expected to meet allocation targets with precision, and that failure to do so would become a new source of friction. However, it has also become clear that the absence of policy on this matter creates uncertainty and apprehensions that are major obstacles to policy change. Moreover, as I pointed out in Chapter 4, the pressures on officials in charge of managing fishing operations are exacerbated by a vague allocation policy, and attempts to placate competing groups sometimes result in overfishing.

In the context of the broad program of reorganization proposed in this report, I have concluded that each competing sector needs to be assured that it will share in the benefits of fleet rationalization. This implies some sort of catch-allocation policy, but not necessarily the fixed catch shares for gear sectors that have dominated discussion of this issue hitherto. Indeed, in the context of significant fleet reduction, that approach could become quite inequitable. If shares were fixed by gear category, and one category were reduced faster than the others with the cost borne by all, the remaining licensees in that sector would enjoy disproportionate benefits.

The important thing, after all, is to ensure that all participants will share the benefits. I therefore recommend a simpler criterion for allocation policy:

8. **The Department should endeavour to allocate the catch among gear sectors of the salmon and roe-herring fleets so that the *average* catch per licensee in each sector increases in equal proportion as fleet reduction proceeds.**

To implement this policy, the average catch of all licensees in each gear sector of the salmon and roe-herring fleets during the past five years should be calculated. The Department's target for future years should be an equal percentage increase (or decrease) from this base among the gear sectors in each fishery. So if the average catch of salmon seiners increases, the average catch of trollers and gillnetters should rise in the same proportion. For these purposes catches should be measured simply by weight, with no separate targets for each species of salmon. In determining average catches, combination boats should be counted in the gear sector in which they harvest most of their catch.

It should be made clear that the targets are not binding commitments on the part of the Department, and that only if the targets are missed by a significant margin in any year, will compensating adjustments be made in the following year. The base catches and targets should be determined separately for each of the three licensing areas for roe-herring, and coastwide for salmon. When area licensing is introduced for salmon (as recommended below), the base catches for salmon should be recalculated for each area.

Area licensing In the preceding chapter I proposed that the coast be divided into three logical regions for management and licensing purposes: the north, south and west zones. Licensing in the roe-herring fishery is already based on these areas, and in view of the two years' experience with this system and the advice this Commission has received on this matter from fishermen and the Department, I propose that it be continued, with certain modifications. This innovation reduces crowding on the fishing grounds during the short season of intensive fishing, it facilitates on-line management of the fleet and, by reducing the threat of excessive fishing power being brought to bear on particular stocks, enables better resource utilization. Moreover, it reduces the fuel and other costs that are otherwise associated with the whole fleet ranging over the entire coast.

For the salmon fishery, area licensing has not been attempted apart from the two-area arrangement for troll fishing. But a comprehensive area licensing system has been widely debated for some time and was discussed at length in this Commission's proceedings.[7] Undoubtedly, benefits could be realized from area licensing for salmon in the form of fleet manageability, resource utilization and conservation, and fuel and other efficiencies. For reasons explained in the last chapter, the whole coast is too large an area to regulate as a single unit, and it is treated as such only because of an accident of political history.

Some fishermen object to area licensing on grounds that it would adversely affect their catch. On average at least, this would not happen because, if anything, the improved manageability of the fleet would enable greater catches than otherwise. However, individual catches might be more variable, and the immediate imposition of area licensing in this fishery would disrupt long-established fishing patterns: the salmon fleet has, in large part, become adapted to unrestricted mobility over the coast, and many vesselowners have invested heavily in engine power and vessel design suitable for this kind of operation. For these reasons I refrained from making a final recommendation on this matter in my Preliminary Report, noting that I would deal with it in my final report after receiving further testimony.

I have now concluded that the benefits of area licensing for salmon warrant its introduction; the problem is how to make the adjustment. I therefore propose that the area licensing already applied in the roe-herring fishery be continued and developed further, and that a transition to a corresponding system be made in the salmon fishery through the following specific measures.

9. **The three-area licensing system for the roe-herring fishery should be continued with certain modifications:**

   i) **Instead of one-year-at-a-time choice of area, each licensee should be required in 1983 to select the north, south or west zone in which to exercise his licence for the duration of its term.**

   ii) **All new licences issued should apply to only one zone.**

10. **The government should declare now that before the 1986 fishing season, all salmon licensees will be required to select one of the three zones in which his licence will apply for the remainder of its term. A year before the zonal licences are issued, the Department should begin to accept elections of zones from licensees to provide plenty of time for adjustments and changes as the distribution of the fleet among zones emerges.**

The next three years will provide time to improve earnings through fleet-reduction measures described below and for vesselowners to plan for modified operations where necessary.

11. **No restrictions, apart from the vessel replacement rules proposed below, should prevent a licensee in either fishery from acquiring from another licensee a licence to fish in another zone.**

The opportunity to acquire a licence to fish in more than one zone will enable fishermen to broaden their fishing opportunities, reduce any risk of greater variability in catch resulting from area licensing, and at the same time reduce the number of vessels in the licensed fleet.

12. **Provisions should also be made for separate licensing of small or pocket areas that offer suitable opportunities for small numbers of vessels.**

A provision of this kind is needed to enable proper utilization of roe-herring and salmon where small runs recurrent in bays or inlets cannot be opened to a large fleet. Arrangements that would authorize a small number of vessels will improve utilization. Indeed, in a few recent cases, informal arrangements have been made on the fishing grounds to permit a small number of vessels from too large a roe-herring fleet to fish a small stock. While it is important to provide legal authority now for such arrangements, I do not expect them to be invoked for a very significant part of the harvest for the next few years at least.

Royalties The proposed initial royalty rates for salmon are set out in Table 8-1. The rate of 10¢ per pound for the higher-valued species and 5¢ per pound for other species are the same as those I proposed in my Preliminary Report.

In view of the government's and participants' reactions to my earlier proposals, an additional comment about the impact of royalties on the financial position of fishermen seems necessary. The royalty proposal is coupled with a proposal for a substantial fleet-reduction program that could be implemented immediately. With a reduced fleet and higher catches per vessel, royalties could be paid out of the additional earnings without lowering fishermen's incomes.

However, the Minister recently announced that he intended to proceed with royalties but postpone fleet reduction. I cannot emphasize too strongly that, in present economic circumstances, this is not a feasible combination. While I have emphasized the desirability of proceeding with royalties without further delay, I cannot support the government in imposing additional levies on the fishing industry until and unless the excess fleet is reduced to improve the returns to fishing or until other events improve the financial circumstances of the industry so it can afford to pay them. Thus, the failure of the government to meet its commitment to introduce royalties this year is fortuitous in view of its hesitation in taking steps to reduce the excessive number of fishing licences it has issued.

Adjusting to a Reduced Fleet

As I have explained, the most urgent task is to reduce the excessive number of licences authorizing fishing in these two major fisheries. Moreover, to minimize uncertainties faced by fishermen and vesselowners, and to give clear direction to the process, explicit targets should be set for a defined period. I therefore propose a program to reduce the two fleets by half of their present licensed capacity over the next decade.

13. **A target fleet should be defined as the objective for fleet adjustment by the end of a 10-year transitional period ending December 1992. The target should be 50 percent of the present capacity licensed to fish in each of the two fisheries, and the same proportion of each major gear sector. For the herring fishery, and after 1986 for the salmon fishery, the target should apply separately to each licensing zone.**

That is, by the end of the transitional period, the capacity of each of the five gear sectors (salmon troll, gillnet and seine; and roe-herring gillnet and seine) should be half its present licensed capacity. For this purpose, capacity should be defined in terms of vessel tonnage, using the established length-to-tonnage conversion table where necessary, except in the roe-herring gillnet sector, which should be dealt with simply in terms of licence numbers.

14. **In 1983 and in each of the following 9 years, the Department should allocate by competitive bids new 10-year licences amounting to one-tenth of the target fleet in each of the 5 categories and, where area licensing applies, by zones. The term of each licence would begin in the year following the bidding for it.**

Bidding one year in advance of the licences' effective date will allow more orderly forward planning on the part of fishermen and vesselowners competing for licences. Bidding procedures to be used are described in detail in Chapter 8. Through these means, by 1993 the target fleet will be fully licensed under 10-year licences, with expiry dates evenly distributed over 10 years. The licences of those who have not replaced them with new licences by that time should expire at the end of their term.

During the transitional period, I propose that only holders of valid initial licences be permitted to compete for new licences. Thus—

15. **Only holders of valid licences should be eligible to bid for new licences issued during the transitional period, and they should be permitted to bid only for licences issued for the zone and category of their current licence (eg. herring seine in the north zone) and for a number of tons of capacity not exceeding the number authorized under their current licence.**

16. **During the transitional period, successful bidders for new 10-year licences should be required to surrender their existing licences. Unsuccessful bidders should be free to retain their current licences, and to compete for licences issued in subsequent years, until the term of their licences end.**

This implies that until 1993, the existing licence holders will be protected from competition from outsiders, and they will be in a privileged position to extend their position in the fisheries for up to another decade. While I think this protection can be justified during the period of fleet reduction, it cannot thereafter; after 1993 any Canadian should be free to compete for new fishing privileges.

After 1993, one-tenth of the licences in each category will expire each year. If that sector of the fleet is considered to be optimal in size at that time, new licences for equal capacity can be issued; if not, the appropriate greater or lesser capacity can be licensed. Accordingly—

17. **In the years following 1993, new 10-year licences should be issued by competitive bids according to the need for greater or lesser fishing capacity in each zone and sector of the fleet.**

This program provides for a substantial rationalization of the fleet, according to a prescribed pattern over a decade. During this period, each initial licensee will have the following opportunities:

i) To continue to fish for 10 years, when his initial licence would expire.

ii) To compete for a new licence in any or all of the 10 annual competitions, with bidding restricted to licence holders.

iii) To surrender his licence before it expires, in return for compensation (proposed below).

At any time during the transitional period the licensee will also be free to transfer his licence to someone else. And after the transitional period, he will be able to compete for new licences allocated thereafter. A licensee who chooses not to acquire a new licence — the first alternative above — will, by the end of 1993, have had 10 years of fishing without the extra annual charges paid by those who acquire fresh licences as a result of their bids.

Certain other features of this program should be noted:

i) Licensees will be required to pay no more for new fishing privileges than they are expressly willing to pay. At the same time, the concern that restrictive licensing bestows capital gains on licensees should end: under these proposals licensees will pay to the Crown the value of the rights they acquire. Moreover, any subsequent transfers would not provide vendors with opportunities for gains they had not themselves paid for.

ii) These procedures enable the government to capture the full value of the resources allocated for harvesting, as evaluated by the fishermen themselves. This is consistent with the policy objective indicated in my terms of reference.

iii) The bidding system will ensure that those who place the highest value on fishing will continue to participate. Segregating bidding by fishery and fleet sector should eliminate biases that might otherwise arise from the greater financial strength of certain gear types. And the limits proposed in Chapter 8 on the holdings of any single licensee will prevent fishing privileges from becoming unduly concentrated.

iv) With fixed terms for all licences, licensing will no longer rest on indefinite government commitments. Immediately, licensees will be granted the security of 10-year terms, and beyond that, in the normal course of events, licensees would hold privileges with remaining terms ranging between 1 and 10 years.

v) Further, with new 10-year licences being allocated every year, newcomers will, after 1993, have the opportunity to enter the fisheries at predictable intervals by paying the government for licences rather than paying other licensees through transfers.

vi) When this fleet-reduction plan is combined with the catch allocation policy recommended earlier, after the initial 10-year transitional period the catch allocation among gear sectors will be identical to that at its inception, since each gear sector will have been reduced by the same proportion (50 percent).

Some fishermen have suggested that open competition for fishing privileges would favour owners of large vessels. This is not supported by the evidence. Statistics on salmon landings indicate that the gross earnings per ton of licensed vessel capacity are actually lower for the largest vessels in each gear category. (When herring landings are added, the largest boats do almost as well, per licensed ton.) So the system should not discriminate against smaller boatowners; in all categories the owners of the most efficiently structured vessels, and with the best skipper and crew, will have the competitive advantage.

I propose that Indian licences in the salmon and roe-herring fisheries be included with other licences in determining a target fleet. However, as I explain in Chapter 12, the government has a special responsibility to protect opportunities for Indians in the commercial fisheries, and I endorse an Indian corporation supported by the Department of Indian and Northern Affairs to assist in this. By participating in the bidding for new licences, that corporation would be free to prevent the reduction of, and possibly increase, Indian participation. These arrangements are consistent with the general policy I have advocated elsewhere in this report: that the fisheries authorities have a responsibility to accommodate programs to deal with special social problems, but that designing and subsidizing such programs should rest with agencies better suited for these purposes.

The magnitude of fleet reduction I propose here is greater than some estimates of surplus capacity, but many underestimate the *potential* capacity of the fleet unencumbered by many of the restrictions on time, location and gear that have been imposed to constrain fishing power. For example, the seine and gillnet sectors are commonly restricted to one day of fishing per week during the salmon season, and the fishing capacity in the roe-herring fishery is even more excessive. In view of the opportunities for relaxing some of the present restrictions on fishing power, and the inevitable progress in fishing technology, I have no doubt that half the present tonnage in these fleets will be capable of harvesting the catch 10 years from now. The need for increased escapements in the short term, the possibility of increased catches in the long term through stock rehabilitation and enhancement, and changes in fishing methods and technology, all raise additional uncertainties about the best size and structure of fleets in the future.

I do not suggest that this target fleet will necessarily be optimal in any technical or economic sense. With the information available at present, no one can reliably specify the optimal fleet size and structure (indeed, in the long run the best fishing system may well include land-based wiers for certain salmon stocks). Eight years ago a Minister's advisory committee recommended that—

> The Fisheries and Marine Service should undertake, as a matter of urgency, an assessment of the relative potential economic efficiencies of the three major gear types, and of combination units. Reliable information of this type is not now available, and is urgently needed for the guidance of the Buy-Back Committee.[8]

But these assessments have still not been made. The optimal fleet is undoubtedly a great deal smaller than the existing fleet; and certainly a reduced fleet could not only harvest the available stocks more efficiently in an economic sense, but would also lend itself to more orderly harvesting in the interests of resource management and conservation. As the fleet is reduced, some of the present restrictions that reduce the efficiency of gear and vessels can be relaxed, and more meaningful analyses of desirable shifts in fleet structure can be made.

VOLUNTARY RETIREMENT AND COMPENSATION

The arrangements outlined above provide for a smaller target fleet to be regulated under a much more satisfactory licensing system after the 10-year transitional period. But it does not provide for any reduction in the fleet's excess capacity for a decade. We need to supplement these arrangements with a means of withdrawing licences during this transitional period, for three reasons. First, without such provisions, a large number of fishermen and vesselowners will be dislocated all at once in 1993; second, the government has some obligation to licensees whose fishing privileges will be terminated, even though they are given 10 years' notice; third and most importantly, the fishing industry and the Canadian people cannot afford to postpone for 10 years the substantial benefits of fleet rationalization.

The latter deserves emphasis. Increased escapements are needed to rebuild many stocks, and this will be difficult without some reduction in the overexpanded fleets. And the economic gain from fleet reduction is costly to postpone, as a simple calculation can illustrate. The landed value of salmon and roe-herring in recent years has fluctuated between $150 million and $200 million. It is not unrealistic to assume that half the fleet could take the catch at half the cost. So if we assume that the fleet is breaking even at its present size, a fleet half that size could realize a net gain of $75 to $100 million annually. For purposes of illustration, with a 15 percent discount rate the present value of $80 million accruing each year beginning now is more than $530 million. This indicates the potential economic advantage of a reduced fleet.

This calculation of economic gains is obviously oversimplified, but more sophisticated computations indicate returns in the same order of magnitude. (Much depends on assumptions about future catches and prices; no change in either is embodied in the above estimate.) It is an impressive sum, and it reflects the enormous waste that has been allowed to develop in these fisheries, as I have repeatedly emphasized.

To realize this gain involves no real economic cost in terms of demands on new labour or capital, though it does require compensating those who would be called upon to retire their labour and capital from the fishery in the short run. However, as I point out below, even the required compensation falls far short of the gains.

The earlier the fleet is reduced, the greater the gains will be. If the $80 million annual gain is postponed for 10 years, its present value falls from $530 million to about a quarter of this figure. (An analogy is the difference in the value of a bond or annuity which begins to yield interest in perpetuity beginning immediately in one case and one which yields nothing for the first 10 years in the other case.)

Fleet reduction should be hastened for several other reasons, the most urgent being—

i) The critical need to reduce catches in order to increase wild stocks for at least a couple of salmon cycles; to do this without reducing the fleet will be difficult.

ii) The need to improve management of the fishing process and the regulation of stocks and yields, which will be facilitated by more manageable fleets.

iii) The need to improve the returns to fishing to accommodate the imposition of royalties on landings.

iv) The need to improve the economics of fishing in the face of softening international markets for fish and rising operating costs in fishing.

v) The liability of the government in guaranteed loans to fishermen. As I point out in Chapter 13, the Department guarantees loans from banks to fishermen. Some $50 million in such loans to west coast fishermen are outstanding at present. I am advised that, at the time of writing this report, about a third of these loans are in default, and hence the guarantees could be called upon. So the government is threatened with the prospect of having to honour these guarantees to lenders with uncertain prospects of recovering much of them even if vessels were seized. Yet the financing problem, as well as the long-term problem of excess fleet capacity, could be alleviated if the funds were used instead to retire licensed fishing units.

vi) The current opportunity, afforded by the depressed state of the fisheries, to reduce the fleet at relatively low cost while at the same time providing an alternative to bankruptcy for many licensees.

A reduction in the fleets would accommodate all of these needs. If, on the other hand, nothing is done to reduce excess capacity and prevent it from expanding, I see little promise for the future of the fishing industry.

Government's Responsibilities in Fleet Reduction

Recommendations in my Preliminary Report for a major fleet-reduction program involving purchase of excess capacity by the government have been widely supported within the fishing industry; but others have expressed reservations about such government intervention, and the government itself has hesitated to endorse the proposal. I infer that some of the reservations are based on misunderstandings about the government's proper responsibilities in this matter. So those responsibilities should be clearly defined.

That confusion should surround this issue is not surprising: to propose that government should deliberately set out to reduce excess productive capacity in private industry is unusual, and the need arises from a unique and complicated problem.

The essential point is that the government should issue no more licences to harvest fish than the resources can reasonably support, and if it issues too many licences, it has a responsibility to reduce them. In other words, the government must accept responsibility for reducing fishing privileges when they are patently excessive. This responsibility rests on statutes and innumerable supporting documents that explicitly state that the federal government is responsible for conserving and managing fish resources, and on the fact that fishing fleets can (and undoubtedly do) impair its ability to do so. Moreover, federal fisheries policy has historically, and especially in recent years, been committed to the "orderly development of the fisheries. . . ."[9] This obviously implies that it is responsible for promoting economic performance, which is impeded as fleet capacity is excessive.

If a government issued rights to cut timber, or to take water from a stream, or to use forage on a range, and it later became obvious that it had issued too many for the resource to sustain, we would certainly expect the government to cut back on the number and size of the privileges. The present circumstances in our fisheries are parallel: the government every year issues far too many fishing licences for a healthy industry. It must therefore reduce the number of fishing privileges now outstanding.

Alternatives

The question now is how the government can reduce fishing privileges in the present circumstances. Some commentators advocate simply leaving fishermen to go broke if the resources cannot sustain them. I cannot support this position. Quite apart from the unacceptability of a government leaving an industry to flounder after having, in effect, invited too many to share in a limited resource, this proposal confuses bankruptcy with eliminating licensed fishing capacity. When a vesselowner can no longer meet his financial obligations, his creditor may foreclose and lay claim to his vessel. It is then typically sold for whatever it will bring. But the vessel will not disappear, and the licence will not evaporate; it will end up in someone else's hands, as those involved in the business of fishing know from long experience:

> Unless some form of buyback or other method to remove fishing power is found, the vicious circle will continue. Some fishermen will go broke and either the bank or the fishermen will sell the vessel to another fisherman who will go back out and put more pressure on the resource, taking some fish out of other fishermens' nets in the process.[10]

In short, it is naive to expect that market forces can be depended upon to eliminate fishing privileges or the excess capacity of the licensed fleet.

The most appealing solution is for the government to establish licensing arrangements that will enable the industry to rationalize itself. This can be done in some circumstances through a system of transferable quotas, as I suggest in the next chapter. But that solution is impractical at present for the salmon and roe-herring fleets. Thus, we are driven inexorably to the conclusion that the government must reduce the number of salmon and roe-herring licences, and the most equitable means of doing so is through compensating licensees for voluntarily relinquishing their licences.

Compensation Policy

In the course of my public hearings, mixed opinions were expressed about the effectiveness of fleet-reduction efforts. Many were critical of the previous buy-back programs, usually on the grounds that the vessels purchased were usually small, old and decrepit, and had accounted for only a small portion of the catch. Hence, their removal from the fleet did not significantly improve the performance of the remaining vessels. My investigations indicate that this criticism is unjustified: the vessels purchased in each gear class had recorded very close to average landings in that class. In any event, the concern seems to reflect some misunderstanding. The main point is that the licences were eliminated; they could (and almost certainly would by now) have been transferred to new vessels with much greater fishing power. Indeed, purchases of older and less costly vessels probably enabled more licensed tonnage to be removed for the money expended.

Support for a buy-back is usually qualified; different groups have different views about who should bear the cost, which sectors of the fleet should be reduced most, who should administer the program and so on. However, I can report that, since the publication of my Preliminary Report with its review of this problem and specific proposals for an independently organized fleet-reduction scheme, virtually every commercial fishing organization has expressed support for measures to reduce excessive fleet capacity, though differences about implementation remain.

A fleet-reduction program must meet certain conditions. First, the broad pattern of reduction must be clarified. The vagueness regarding this matter in my Preliminary Report caused anxiety among fishermen.

> The proposed vessel buyback program has been the focus of much discussion and controversy among industry representatives. Generally, most industry groups have been receptive to the concept, but they question the exact form of the program. They express concern that the final (post buyback) structure of the fleet has not been articulated, spelled out clearly, and thus each group is fearful that it may be adversely impacted by the program. In other words, each organization is concerned that it may [be] the group to bear the costs, not reap the benefits, of the program.[11]

My proposals for reduction to a target fleet over a decade are aimed at eliminating this uncertainty.

Second, it must be a substantial program, sufficient to withdraw a significant amount of licensed capacity to cushion adjustment to the proposed target fleet. Third, it should concentrate on licences as opposed to vessels. Fourth, fishermen and vesselowners should participate in, and have an influence on, the program's operation. Fifth, the cost should be shared between the government and those who expect to benefit most directly from fleet rationalization, namely holders of fishing licences. Sixth, the program must have financial integrity; that is, it must have its own sources of funds and the ability to manage its own revenues, and it should be financially accountable. Its activities must be designed to minimize upward pressure on the value of licences as the fleet-reduction program proceeds. Finally, the buy-back scheme must be buttressed with rigorous rules and administration of the licensing arrangements to close loopholes, to reduce discretionary issuance of new licences and to tighten control of vessel replacement, which otherwise threaten to frustrate any attempt at fleet reduction.

Two points deserve emphasis. First, the government's main responsibility is for licences, not vessels. The number of boats in the fleet will be governed by the number of licences issued, but it is the latter which the government has created and for which it is responsible. Vessels, in contrast, are the private property of vesselowners, created by them alone. The government's responsibility for vessels is therefore much less direct. Eliminating excess licensed fishing capacity is the ultimate goal of a fleet-reduction program, but reducing the number of licences issued by the government is the instrument. Sometimes acquiring vessels may expedite licence acquisitions, but it should be done only when that is the case. My present proposals, outlined below, avoid the necessity of the government becoming directly involved in acquiring vessels.

The second point has to do with the appropriate compensation to be paid to a licensee for relinquishing his licence. The proper amount cannot be less than the value of the licence in the private marketplace; otherwise, selling a licence privately would always be more advantageous. Nor should it be much more than this; any payments in excess of the minimum required to retire the desired number of licences would impair the degree of rationalization that can be achieved with the available funds. This point deserves emphasis because a number of participants suggested that compensation be based on some factor, such as recent earnings, or the age of the vessel or fisherman, and so on. For the reasons given here, these would undoubtedly fail to serve the purpose.

Organization and purpose I therefore propose a program aimed at reducing the licensed salmon and roe-herring fleets during the transitional period, through the Pacific Fisheries Licensing Board recommended in Chapter 8. Fair compensation will be offered to those who voluntarily relinquish their licences. Specifically, I recommend that the following steps be taken:

18. During the 10-year transitional period beginning in 1983, the Pacific Fisheries Licensing Board should reduce the excess licensed capacity in the salmon and roe-herring fleets (i.e. the difference between present and target fleets), offering compensation to licensees for voluntarily relinquishing their licences.

19. To carry out these purposes the board should have the capacity and powers to enter into contracts, to deal in fishing licences and vessels, to borrow and invest funds and to manage its own finances.

The objective should be to reduce licensed capacity as quickly and efficiently as funds allow. Since the board's mandate extends to two fisheries, with funds coming separately from each (as I propose below), some guidance is required about the allocation of funds between the two fisheries. Thus I recommend-

20. The board should direct its funds to retiring capacity in the salmon and roe-herring fleets, in proportion to the funds it receives from each fishery.

21. For each fishery the board should use the funds available to it in any year to withdraw as much licensed capacity as possible by accepting the lowest offers in terms of the compensation asked per licensed ton of vessel capacity.

To deal with roe-herring gillnet licences that will not specify vessel tonnage, the board should ascribe to them a standard tonnage for this purpose, based on the statistical average catching power of these vessels relative to seine vessels.

There will be no need for the board to focus its activities on individual gear categories within each fishery because the catch allocation proposal made earlier in this chapter will protect the interests of licensees in each sector in any event. Nor should the board concern itself with the zones in which the retired licences apply; those in areas where capacity is most excessive will carry the lowest value in any event.

To retire licences at the lowest cost, the board should regularly and publicly invite sealed-tender offers for licences from licensees in each of the two fisheries and accept the lowest offers within the funds available. I intend that the board should not normally acquire vessels with the licences, but circumstances might arise in which acquiring options on licences or vessels, or both will prove expedient. But whatever means it chooses, the board should be free to respond to the most favourable offers it receives, unfettered by political or social priorities. First and foremost, the board's thrust should be to reduce licensed capacity in excess of the target fleets.

Funding Financing the compensation program should be shared by the industry — because it can expect to share the benefits — and by the government — because it is directly responsible for ensuring that only the proper number of fishing privileges is issued.

22. Funds should be made available to the Pacific Fisheries Licensing Board from four sources:

- **i) An initial grant from the federal government of $10 million.**
- **ii) A payment each year equal to the royalties paid in that year on roe-herring plus one-half of the royalties paid on salmon (the other half to be devoted to resource enhancement as described in Chapter 5). This amount should be doubled by means of a dollar-for-dollar matching grant from the federal treasury.**
- **iii) Payments from the federal government each year in amounts equal to the revenues from competitive bids for salmon and roe-herring licences.**
- **iv) Borrowing. The board should be empowered to borrow, against its anticipated revenues, a maximum of $100 million.**

The initial grant approximates the amount of extra licence fees, with interest, that have already been collected for fleet-reduction purposes in recent years and not yet expended. Revenues from royalties, matched by the government, and from licence sales will provide the board's on-going funding. The borrowing power will enable the board to generate the considerably greater benefits from reducing the fleet as much as possible in the early years, before it can realize much of its income. I emphasize that the proposed corporate structure of the board is an essential condition of the recommended fleet-reduction program. Only in this way can the funds allocated for this purpose be accounted for separately and freed from the vagaries of year-to-year government budgeting. The established procedures of the Treasury Board and governmental departments are not suited to an operation such as this, which must be flexible, businesslike and capable of making quick and independent financial decisions. The operation should be largely separate from the Department of Fisheries and Oceans and provide for a large degree of control by the fishing industry. The proposed corporate structure thus would meet the essential conditions for an effective fleet-reduction program.

The target fleet will be achieved by 1993. After that time the more systematic licensing system will provide the government with much better control over fleet development, and the need for the board to be involved in compensating licensees for relinquishing licences should therefore be reviewed. The board should continue with its responsibilities over licensing and appeals, however.

Economic and Financial Consequences

The economic implications of these proposals can be illustrated by considering the range of possibilities. At one extreme, no licences would be retired during the transitional period. Assuming conservatively, as before, that the fleet now breaks even, and that there will be no increase in fish catches, costs or prices in excess of inflation, no gains would accrue until the end of the transitional period in this case. Then, with the fleet reduced to half, the roughly $80 million annual net gain referred to earlier would begin to accrue. At a 15 percent discount rate, the present value of that future stream of net gains (beginning 10 years hence) is $132 million.

At the other extreme, the Pacific Fisheries Licensing Board would purchase and retire all the capacity in excess of the target fleet in the first year. Then the $80 million annual gain would begin to accrue immediately, and would have a present value of $533 million.

A third and middle possibility is that the temporary licences would be phased out as I propose, and the capacity in excess of the target fleet would be withdrawn in equal increments in each of the 10 years of the transitional period. In this case, the present worth of the gains is $308 million.

The compensation payments required in each of the three cases can also be estimated. In the first case, they would be zero. The other cases require assumptions about licence values; for illustrative purposes we might assume that salmon licences are valued at an average of $50 thousand, roe-herring seine licences $65 thousand and gillnet licences $17.5 thousand, and that these will decline at a steady rate to zero when they expire in 1992. To purchase and retire half the licensed capacity in the first year would thus require $132 million in compensation payments, and for the middle case the compensation payments would be spread over the 10-year transitional period and have a present value of $50 million. So even allowing for reasonable compensation, the financial benefits of reducing the fleet are substantial.

The prospects of this scheme from the government's narrower financial viewpoint can be summarized as follows. Its direct financial contributions consist of an initial grant of funds already collected from the commerical fishery for this purpose, and additional funds to be collected mainly from the fishing industry. On the revenue side, the proposed roe-herring royalties and half the salmon royalties will initially amount to roughly $7.5 million annually, and without allowing for any increase in landings, real prices, or royalty rates, this has a discounted (at 15 percent) present worth of $50 million. The half of salmon royalties directed to enhancement is additional.

Further revenues will accrue in the form of annual payments in respect of the bonuses bid at licence auctions, and in the long run this can be expected to yield the largest revenues. The target fleet's net return is estimated at $80 million annually, and as long as the auctions are competitive the largest part of this can be expected to eventually be reflected in bonus payments. But because of the lags involved in this scheme (throughout the subsequent decade some licensees will hold licences acquired during the transitional period and before the target fleet is reached) the full amount will not be realized in annual payments until the nineteenth year. If we assume these payments will rise steadily from the first year to $80 million in the nineteenth year, they have a present worth (discounted at 15 percent) of $158 million. I exclude revenues from fishing vessel licence fees because I have suggested that they should cover no more than administrative costs.

The government's financial participation in this program should be viewed in the light of my complementary proposals in Chapter 13 to abolish subsidies and tax concessions, which have recently amounted to several millions of dollars annually, and the government's liabilities in loan guarantees.

Vessel Disposal

I have emphasized that the board should concentrate on retiring fishing privileges, not vessels. But if it finds it expedient to acquire vessels, it should be free to dispose of them whenever they will bring the best price, in Pacific fisheries or elsewhere, and to recycle the receipts for additional withdrawals of licences. I am advised that a number of developing countries (among which are those that Canada accords priority for economic aid)[12] have expressed a considerable interest in west coast fishing vessels. I therefore recommend that—

23. **The Canadian government's foreign assistance agencies should carefully examine opportunities for disposing of surplus vessels in ways that would complement this fleet-reduction program.**

VESSEL REPLACEMENT POLICY

A fleet-reduction program will have a lasting effect only if the remaining fleet can be prevented from expanding its capacity. As already explained, under the restrictive licensing of the salmon fleet the number of vessels has declined, but the remaining vessels are larger, more powerful, more expensive and much more efficient in terms of catching capacity. In effect, much of the projected benefit from past licence limitation and buy-back activities has been dissipated through vessel replacement. Obviously, the existing restrictions on replacement are seriously deficient as means of preventing expansion of fishing capacity.

In my Preliminary Report I recommended, as an interim measure to discourage further investments in new vessels, that replacement rules for salmon vessels be made more stringent by reducing the eligible size of a replacement vessel from 100 percent to 80 percent of the length and tonnage of the vessel being replaced. This proposal has been criticized: it has been argued that, among other things, such a rule would impinge unfairly on owners of small vessels, because a 20 percent reduction in some small vessels would leave them unseaworthy, unsafe and inefficient.

Concern focuses on replacements of old vessels with newly constructed, more powerful vessels. In the context of the fleet-reduction program proposed above, which will leave large numbers of used vessels on the market, this problem can best be solved by prohibiting additional, newly constructed vessels from entering these fisheries for the time being. I therefore propose the following:

24. **No new vessels, except those already under construction at the time this report is released, should be eligible for any commercial fishing licence during the 10-year transitional period. Exceptions might be necessary for new fisheries or unusual ventures, but not for any of the developed fisheries.**

25. Licensees should be permitted to replace their vessels with vessels that already carry commercial fishing licences, subject to the established foot-for-foot and ton-for-ton replacement limits. Herring gillnet licensees should be free to replace their punts with other punts without restriction.

26. The Pacific Fisheries Licensing Board (proposed in Chapter 8) should be asked to consider whether a new vessel replacement policy is needed after 1993 and to recommend accordingly.

These proposals will enable any vesselowner who wishes to replace his vessel, or whose vessel is destroyed, to replace it with another vessel, as long as the replacement meets the size criteria and is not newly constructed. The fleet-reduction program should ensure a ready supply of already-licensed commercial fishing vessels over the transitional period.

After the transitional period, the Pacific Fisheries Licensing Board can respond to needs for adjusting fleet size and structure by increasing or decreasing the capacity it licenses in each sector through allocating new licences. This will afford an effective means of controlling the fleet. Coupled with the proposed royalties, elimination of subsidies and vessel replacement controls, these arrangements should offset tendencies toward fleet expansion.

LONG-TERM POSSIBILITIES

The set of proposals in this chapter is an attempt to break the log jam in fleet rationalization. They are ambitious, but they are manageable, and I see no piecemeal measures that offer much promise. The measures suggested are designed to provide the framework of governmental regulation and to engage the industry in trying to improve its own structure and performance.

But I want to emphasize again that these licensing arrangements will need continuing adaptation and development. If my proposals are followed through, we can expect that in 10 years the fleets in the salmon and roe-herring fisheries will be much smaller and will be enjoying increased economic returns. They will be controlled by much more satisfactory licensing arrangements that will identify a group of licensees with each of the three management regions. But it will not be an ideal fleet. Unless available catches increase dramatically, some sectors will need further reduction, especially in the herring fishery, but also probably in the salmon fishery as technology develops and new innovations for producing and harvesting are introduced. Moreover, the composition of gear types in the fleets will need to be altered with time.

As I explained earlier, the basic approach to regulating fleets through restrictions on vessel dimensions is inadequate for the long run. Indeed, the changes I propose in this chapter for these two major fisheries do not lead to such a durable system as those I propose for smaller fisheries in the next chapter. So, in implementing the recommended changes, the fishermen and the government should also begin to consider subsequent steps. These will have to be geared to the changed circumstances of that time, but some possibilities deserving examination are these:

i) Individual catch quotas. Individual quotas of the kind I propose for other fisheries in the following chapter would be more difficult in the salmon and roe-herring fisheries, but with smaller fleets licensed by gear, and with area licensing, the possibilities will be much more feasible, especially for herring. The United Fishermen and Allied Workers Union has developed ideas along this line for the roe-herring industry, though in my opinion their suggestions could be improved by relaxing the proposed rigid equality of nontransferable quotas and the requirement that all licensees continue to fish each year.[13] A system closer to that I propose in the next chapter for the food and bait herring fishery may well afford a feasible means of promoting rationalized fishing. With gear licensing and catch allocation, such a system need not be introduced all at once; the most suitable sectors, such as the gillnet sector of the roe-herring fishery in the south zone, could be attempted first. In the salmon fishery, the troll sector in certain areas probably offers the most promising opportunities; and with experience with quotas in other fisheries, the fishermen are likely to react to this approach more receptively than they have hitherto. Washington State trollers are already investigating such a system.

ii) Cooperatives. In principle, the roe-herring fishery lends itself well to a cooperative of fishermen within a gear sector and area. The cooperative itself could organize an efficient fishing plan, dispatching the number and kind of vessels required to take the catch and dividing the returns among the members according to their shares. This might be combined with an individual catch quota system, which would be the basis for determining shares. Groups of salmon fishermen, such as gillnetters, who traditionally fish a particular estuary, might find it advantageous to establish similar arrangements under subzonal licensing.

iii) Pocket fisheries. With other changes in fisheries management and administration proposed elsewhere in this report, we can expect that potential benefits from issuing a limited number of fishing privileges to harvest small stocks in specific areas will increase in future. This arrangement could of course be linked with fishermen's cooperatives.

iv) Mariculture leases. In Chapter 11 I propose a system of mariculture leases for ocean ranching salmon and advocate a few early pilot projects. In the longer term, this system may prove advantageous on a larger scale, as it has in other countries.

I emphasize that these are not recommendations, only suggestions to be considered for the longer term.

At the outset of this lengthy chapter I indicated that my proposals were directed toward four main objectives. The first was to improve the economic performance and management of the salmon and roe-herring fisheries by reducing the excessive fishing capacity. The proposed fleet-reduction program is designed to accomplish this, and will go a long way toward rationalizing these fisheries. The second was to ensure that the smaller, healthier fleet would not expand to frustrate the reduction effort. Removing subsidies for vessel construction and improvements (recommended in Chapter 13), prohibiting new vessels from these fisheries, and the proposed royalties will all reduce the tendency for fleets to expand. Moreover, the comprehensive gear licensing proposal will remove an important avenue for expanding fishing power.

The third goal was to ensure that the necessary changes would be fair to those directly affected and would not forcibly and suddenly disrupt fishermen and investments committed to these fisheries. Thus my proposed fleet-reduction plan is phased; it provides security and predictability for at least 10 years; it offers established licensees several options including protection from outside competition for new licences and compensation for voluntary withdrawal, and it affords continuing assurance that the catch allocation will be fair to all sectors.

The fourth objective was to introduce a more systematic and effective licensing system. My recommendations in this chapter would remove the inconsistencies between the licensing arrangements for these two related fisheries, provide long-term security to licensees, eliminate a variety of unnecessary regulations, and provide a regular opportunity for the government to adjust the number and type of licences outstanding.

The combined effect of all these changes should provide the framework needed for a successful program of fleet reduction which, in turn, is the key to lasting improvements in these fisheries.

FOOTNOTES

1. The Fisheries Association of B.C., Exhibit #186, p. 4.

2. Press Release. Minister of Fisheries, September 6, 1968.

3. See G. Alex Fraser, License Limitation in the British Columbia Salmon Fishery. Fisheries and Marine Service, Environment Canada, Technical Report Series No. PAC/T-77/13, Vancouver, 1977; Peter H. Pearse, Rationalization of Canada's West Coast Salmon Fishery: An Economic Evaluation, in Economic Aspects of Fish Production. Organization for Economic Cooperation and Development, Paris, 1972, pp. 172-202; Blake Campbell, Problems of Overexpansion in the Salmon Fleet in British Columbia. Department of Fisheries and Forestry. Vancouver, 1971; P.H. Pearse and J.E. Wilen, Impact of Canada's Pacific Salmon Fleet Control Program, Journal of the Fisheries Research Board of Canada, Volume 36 No. 7, 1979. pp. 764-9.

4. To aggravate matters, many of the salmon licences awarded to vessels that had not fished salmon were later transferred to new salmon vessels. The active salmon fleet expanded by about 80 seine vessels by this route.

5. Original "B" Fishermen's Association, Exhibit #56.

6. "Interim Report: Sub-Committee on Salmon Catch Division." Prepared for the Department of Fisheries and Oceans, 1980.

7. D. Dawson, Exhibit #185, is a submission devoted mainly to this subject. See also the transcript of the examination of this exhibit.

8. West Coast Salmon Fleet Development Committee Report. Fisheries and Marine Service, Department of the Environment, Vancouver, April, 1973. p. 7.

9. Economic Development for Canada in the 1980s. Government of Canada, November, 1981. p. 17.

10. Exhibit #186, p. 4.

11. The Native Brotherhood of British Columbia, Exhibit #198, p. 37.

12. W.R. Perry, Exhibit #109.

13. "Statement on Roe-Herring Licensing and Management." Prepared for the United Fishermen and Allied Workers' Union Herring Roe Conference, 1981.

CHAPTER 10

LICENSING THE SMALLER COMMERCIAL FISHERIES

> *...there now exists an array (of licences) which is administratively most vexatious, which sorely challenges the data banks and competence of licensing and field personnel to implement and enforce, and which often confuses and frustrates fishery participants.*
>
> DEPARTMENT OF FISHERIES AND OCEANS[1]

In Chapter 8 I outlined a framework for a comprehensive licensing policy for commercial fisheries on the Pacific coast, and in the preceding chapter I dealt with the two most important of these, the salmon and roe-herring fisheries. This chapter deals with the rest. They depend on a wide variety of natural resources and support substantial economic activity with landings of $30 to $35 million annually, although this is only about one-quarter of the value of salmon and roe-herring.

The recent volume and value of landings in these smaller fisheries, and the relative prices of the products are shown in Table 10-1. The fisheries have little in common. Some, like abalone and spawn-on-kelp, yield extremely valuable products, while others are marginal or uneconomical. New fisheries, like the geoduck fishery, contrast with the very old and mature fisheries, such as that based on halibut. They include groundfish, pelagic fish, shellfish and crustacea. And the technology of fishing varies, as does the productivity and condition of he stocks.

Serious difficulties have arisen in managing most of hese fisheries, and for some of the most important the roblems have become acute. This is not due to inaction n the part of the Department of Fisheries and Oceans, ut rather to the lack of a coherent and effective licensing olicy. The review in the following pages reveals that it as not provided a framework within which the industry ould evolve efficiently, with the result that major hanges are now required to overcome profound structural problems and to ensure that they do not recur.

The Department has responded to rapidly changing vents with innovations in licensing as they appeared to e needed. Only 14 years ago anyone could fish commercially for any fish on the Pacific coast. The controversial Davis plan was introduced to control the salmon fleet in 1969 and a different scheme for roe-herring was initiated in 1974. Since then one fishery after another has expanded, overexpanded and belatedly been subjected to restrictions on additional entrants through a licensing program. As a result of this flurry of licensing, participation in all of the major fisheries is restricted to the limited number of licence holders shown in Table 7-1. Eleven forms of restrictive licences are now in place on the Pacific coast, several with subcategories, as well as a variety of permits and other authorizations.

Table 10-1 Volume and landed value of the major commercial species in British Columbia[a]

	landings in 1981[b]		approximate price in 1981
	volume	value	
	(metric tons)	(million dollars)	(dollars per pound)
salmon	74,476	154.3	$0.56 to $2.20[c]
herring (roe)	29,300	32.9	0.51
herring (food & bait)	8,663	2.2	0.12
halibut	2,159	6.4	1.35
sablefish	3,720	4.9	0.88
grey cod	5,154	2.7	0.24
ling cod	1,780	1.6	0.41
rockfish	9,029	3.0	0.15
sole	4,282	2.2	0.23
pollock	1,106	0.2	0.11
turbot and flounder	1,149	0.2	0.09
dogfish	755	0.1	0.08
tuna	200	0.4	0.91
other pelagic and estuarial species[d]	261	0.8	1.46
crab	1,191	2.6	0.99
shrimp and prawns	839	2.6	1.41
geoducks	2,620	2.1	0.36
abalone	73	0.7	4.25
clams and horse clams	754	0.7	0.41
herring spawn-on-kelp	186	3.0	7.33
hake	6,200	0.9	0.06
other fish and fish products[e]	2,452	1.0	0.18

[a] The figures in this table do not correspond in all cases to the figures in the text because of different sources of data.
[b] Preliminary data from the Department of Fisheries and Oceans.
[c] The low figure is for pinks, the high for chinook.
[d] Includes skate, sturgeon, eulachons, smelt.
[e] Includes non-food fish, octopus, salmon roe and other fish.

The specific recommendations in this chapter for improving licensing arrangements for these smaller fisheries follow from the framework for commercial licensing policy outlined in Chapters 7 and 8. There I explained the inherent weakness of limited-entry licences and the superiority of quota licences as means of allocating fishing privileges and promoting orderly fleet development. In Chapter 9 I have recommended that limited-entry licences be retained for the time being for the salmon and roe-herring fisheries because the special character of these two major fisheries makes individual catch quotas impractical. But those obstacles do not exist, or at least are more manageable, in these smaller fisheries, and so I propose that they should be managed henceforth under quota licences.

Well-designed quota licences for these fisheries will undoubtedly promote fleet rationalization, enable better management and, once in place, will be advantageous to those involved in the fisheries. The most sensitive task is that of making the transition from the present arrangements equitably and without causing dislocation of established interests. I therefore turn first to propose general procedures for effecting the transition to quota licences for all of these fisheries.

TRANSITION TO QUOTA LICENCES

Most of these fisheries are now regulated under limited-entry licences and, in many cases, too much fishing capacity has been licensed. Quota licences will provide a much more suitable system for managing and rationalizing the currently distorted structure. A major theme in this chapter is therefore how to transform limited-entry licensing into a system that enables the allowable catch to be allocated directly among licensees.

Initial Quota Licences

The shift from an established limited-entry licensing system to individual quotas will require procedures to bridge the old and the new. In Chapter 8 I concluded that fishermen who have demonstrated a dependency on a fishery should be "grandfathered" in under new licensing arrangements. When quota licences are introduced, the fairest way to allocate the allowable catch among the established participants in the fisheries is according to their shares of the catch in the recent past. The selection of the base years for determining past participation is important, however; long periods dilute the impact of abnormally high or low catches in any one year, but they tend to discriminate against recent entrants and those who have recently increased their catch shares. On the other hand, a very short period — such as a single season — can lead to serious distortions among fishermen. My recommended choice is intended to strike a reasonable balance between extremes.

1. **Where a quota licensing system replaces an established limited-entry system, all owners of licensed vessels that were eligible to fish for the relevant species and reported landings in 1980 or 1981 should be issued initial 10-year quota licences.**
2. **The amount of quota authorized under each licence should be determined with reference to the licensee's reported landings in 1980 and 1981 and the total allowable catch, as follows:**
    - **i) Where the total reported landings of all eligible licensees averaged over 1980 and 1981 is equal to or greater than the total allowable catch of the fishery, the total allowable catch should be divided among all eligible licensees in proportion to their shares of the catch averaged over 1980 and 1981.**
    - **ii) In all other cases (that is, where there is excess total allowable catch), the licence should allocate a quota equal to the licensee's average reported landings in 1980 and 1981.**

Through these means the available catch in crowded fisheries can be divided fairly among eligible licensees, but the excess in underutilized fisheries will be available for allocation to anyone.

Later in this chapter, I recommend that quota licences be issued for specific zones, typically the north, south and west zones described in Chapter 8, or subzones within these. To guide the allocation of initial licences among zones I propose the following:

3. **Initial quota licence holders should be required to select the licensing zone or zones in which their licences will apply.**
    - **i) As long as the quotas identified with a zone by this method are in total less than the allowable catch for the zone (less a reserve for appeals), quota licences should be issued without adjustment.**
    - **ii) If the quotas identified with a zone by this method exceed the total allowable catch for the zone, all quotas should be reduced *pro rata*. Licensees whose quotas are thus reduced should be offered a quota equal to the amount of the reduction in any other zone where the allowable catch is not fully allocated.**

In complicated cases, it may be desirable to adopt supplementary procedures in which licensees rank their preferences, and quotas are allocated in successive rounds with priority to first choices.

Provisions for Appeals

The proposed rules for initially allocating the new fishing privileges may be unfair to some fishermen. In the past, when new limited-entry licences have been introduced, special appeal committees have considered the special circumstances of individual fishermen and have recommended that eligibility criteria be waived or relaxed to prevent hardship. These have served a useful purpose and this general approach should be followed in future.

4. **Where a quota licensing system is introduced to replace a limited-entry system, the Pacific Fisheries Licensing Board (recommended in Chapter 8) should consider appeals from licensees and others who claim, within a short notice period, that the rules determining initial eligibility for quota licences would treat them unfairly.**

For many new quota fisheries, a reserve will need to be set aside to satisfy appeals. Any quota remaining after all appeals have been considered should be added proportionately to the initial allocations.

5. **Any portion of the reserve for appeals that remains unallocated after all appeals have been considered following introduction of new quota licences, should be distributed *pro rata* to all initial quota licensees in the fishery.**

The procedures set out above should be used to reconcile the selections of areas by those who successfully appeal, where applicable.

Finally, the Department should obtain the advice and guidance of licensees before implementing new quota systems.

6. **A committee of licensees should be appointed to advise the Department on the mechanics of implementing each quota system and to recommend to the Pacific Fisheries Licensing Board clear guidelines for dealing with appeals from initial quota allocations.**

New Licence Allocations

These rules will govern initial allocations of quota licences in each fishery. In Chapter 8 I proposed the basic framework for a continuing quota licensing system. This involves issuing new 10-year quota licences through competitive bidding procedures, with approximately one-tenth of the total allowable catch for a species being allocated each year.

For a transitional period of 10 years following the introduction of each quota licensing system I propose the following special arrangements:

7. **During each year of a 10-year transitional period following the introduction of a quota system to a fishery, the Department should invite licence holders to bid for replacement 10-year quota licences authorizing in total one-tenth of the current allowable catch for the fishery.**

8. **During this period licensees should be eligible to bid for the amount of quota they currently hold, and they should be required to relinquish an amount equal to that authorized by any new licence they acquire.**

In certain cases these procedures for allocating initial licences to established fishermen will leave some of the allowable catch unallocated. This should be made available as follows:

9. **If, after all initial licensees are provided for under these arrangements, there remains unallocated allowable catch in any zone, or the allowable catch is later increased, the surplus should be made available under additional 10-year quota licences without restriction on the eligibility of applicants, as follows:**
   i) **If applications in any year fall short of the unallocated allowable catch, applicants should be issued licences for the amount of quota they apply for.**
   ii) **If applications exceed the surplus allowable catch, new quota licences should be issued through competitive bidding procedures.**

These arrangements should govern surplus allowable catches that are expected to prevail for some time. Temporary surpluses resulting from cyclical fluctuations in stock abundance should be provided for through temporary permits.

As I recommended in Chapter 8, the Department should always have the power to reduce quota allocations in the event of necessary reductions in the total allowable catch, and any such reduction should be proportionately absorbed by quota holders.

Thus, at the end of the transitional period, the authorized catch of each quota fishery will be embodied in licences with terms ranging from one to ten years. Thereafter, new licences can be issued regularly as licences expire and any increase in allowable catches can be allocated in new licences. As recommended in Chapter 8, anyone would be eligible to bid for quota licences following the transitional period.

In Chapter 8 I recommended that responsibility for administering licensing be assigned to a new Pacific Fisheries Licensing Board, but this agency might not be established in time to implement the changes in licensing policy recommended in this chapter. Accordingly, when I refer to the Department henceforth, it should be understood that this is intended to be a reference to the board, once it becomes established.

For each fishery examined below, I begin with a sketch of the present licensing system and the problems surrounding it. This is followed with specific proposals for reform. My recommendations are designed with reference to the Commission's terms of reference and the analysis of regulatory problems and objectives in Chapter 7.

HALIBUT

During the last few years the organization of the halibut fishery has deteriorated seriously. The licensing system applied to this long-established fishery has been extremely troublesome and badly managed. In spite of a limited-entry system intended to prevent it, the licensed fishing capacity has expanded alarmingly. At the same time, both the available catch and prices have fallen sharply. Submissions made at the public hearings reveal that the administration of fishing licences has been unsatisfactory to those engaged in the fishery as well as to those excluded.

Background

The halibut fishery is one of the oldest on this coast, and the stocks among the most valuable.[2] It has a long history of regulation. By the early 1920s, it had become obvious that the major stocks off northern British Columbia and Alaska were being severely depleted by overfishing. In response to this, and because of the transboundary nature of the stocks, Canada and the United States jointly signed the Convention for the Preservation of the Halibut Fishery in 1923.[3]

Under this convention, the International Fisheries Commission was created. (It was renamed the International Pacific Halibut Commission in 1953.) The commission was made responsible for recommending regulations to both governments for improving the biological management of the halibut fishery. Under the convention, Canada and the United States signed a declaration of intent to comply with the regulations recommended by the commission, which itself had no power of enforcement in either country.

The initial conservation measure imposed under the auspices of the commission was a three-month closure. This proved to be inadequate, and in 1930 the commission was granted greater powers which enabled it to set catch quotas by area, to regulate gear and to close nursery areas. Since then, the commission has set a total allowable catch for each of three administrative areas in the North Pacific. However, because the commission itself had no authority to regulate participation in the fishery,[4] the fleet expanded under unrestricted entry. Thus, the fishing season had to be progressively shortened to a few weeks per year.[5] Nevertheless, for some years the commission's policies appeared to be succeeding in restoring the stocks.

The evolution of the halibut fleet is a vivid example of how an open-access fishery operating on valuable stocks will tend to attract excess capacity. The first result was stock depletion, which is the problem that the commission was set up to deal with, and did so with some success. But as the stocks were rebuilt and the value of the halibut increased, the fleet expanded. Progressive shortening of the season meant that the fleet was idle most of the year. Shore facilities had to cope with the whole catch in a short period, leading to increased capacity, higher costs and instability of operations. Nearly all the catch had to be frozen, and the fresh market, which brings higher prices, could be served only briefly during the fishing season. And, of course, with all this excess capacity and cost, returns from these highly valued resources remained low.

Recently, two events have put new pressures on the industry. During the late 1960s and early 1970s, catches declined dramatically as did the apparent size of the stocks, due partly to environmental changes but mainly to incidental catches of halibut by foreign high seas trawl fleets. Because of the longevity and late maturation of halibut, the stocks take many years to recover, and they remain in a depressed condition today. The stocks off northern British Columbia, which depend on young fish migrating from the north, have been recovering particularly slowly, and there is growing anxiety about their apparent displacement by large populations of dogfish.

The other event was the declaration of 200-mile fishing jurisdictions by Canada and the United States toward the end of the 1970s. Initially, fishermen who had been operating in the other country's waters were permitted to continue to do so, but disagreements and conflicting pressures led to termination of these arrangements. As a result, U.S. fishermen were excluded from fishing within Canadian waters in 1979, and Canadian fishermen were phased out of the Alaskan fishery by 1980. The impact on U.S. fishermen was relatively light, but because two-thirds of the Canadian halibut catch had been taken in U.S. waters off Alaska, the impact on Canadian fishermen was substantial.

The government took several steps through an Alaska Halibut Relocation Plan to minimize the dislocation caused by the curtailment of Canadian access to Alaskan halibut fisheries. Longline vesselowners who failed to meet the entry qualifications for new limited-entry halibut licences (explained below) were offered compensation for their longline gear. Those who had fished mainly in Alaskan waters and had licences to fish in other fisheries were encouraged to retire their halibut licences in exchange for compensation for their halibut gear and a vessel-share grant. Alternatively, these fishermen could relinquish their halibut licences in return for a vessel and gear conversion grant to enable them to enter the sablefish fishery. Of the 54 vessels excluded from Alaska and eligible for these grants, 16 surrendered their halibut privileges under the scheme; the remainder received halibut licences.

Limited Entry

As long as Canada and the United States had no agreement on sharing the catch, neither could benefit from controlling the expansion of its fleet: any limit placed by one country on its fleet would simply result in the other country taking more of the catch. But in 1979, when the division of the catch from the remaining international stocks was specified, this obstacle to controlling the fleet was removed. Moreover, with the catch available to Canadians now greatly reduced, the need to control and reduce the fleet size had become acute.

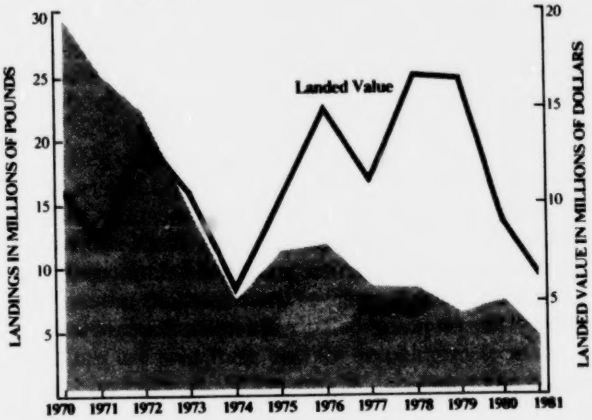
The Canadian government therefore imposed restrictive licensing in the halibut fishery in 1979. New halibut ("L") licences were issued to vessels that had reported halibut landings of at least 3,000 pounds (dressed, head off) in either of the preceding two years. Initially, the landings qualifications had to be met with halibut caught on gear other than troll; the traditional halibut fishery uses mainly longline gear, and this rule was intended to exclude salmon trollers who caught halibut incidentally. This first eligibility criterion was met by 281 vessels, and another 50 or so were found to be eligible after errors in sales slip information were uncovered. About 400 fishermen who had fished halibut did not meet the licence requirements and were excluded from the fishery. These were mostly part-time halibut fishermen who operated small boats, and in total they accounted for less than 20 percent of the catch.[6]

However, shortly after these new restrictions were introduced they were relaxed, and generous grounds for appeal were provided. Because of the difficulty in determining how halibut had been caught during the qualifying period, the exclusion of troll-caught landings from the qualifying catch was lifted. The Minister announced also that appeals would be considered from those who could not meet the landings qualification but could demonstrate "substantial financial dependency" on halibut fishing and could not turn to other fisheries. Also, consideration was to be given to vesselowners who could show a "significant financial commitment" to the fishery, including some who had introduced boats just prior to the new restrictions and therefore did not meet the landings qualifications. The appeal board was faced with a flood of appeals, and some 100 additional licences were approved.

The result of the low landings qualifications and generous appeal provisions was that, by 1981, the licensed halibut fleet had grown from 331 to 422 vessels, while fewer than 100 vessels had operated mainly in the halibut fishery prior to the introduction of limited entry; this difference is sharpened by the fact that the fleet now has access to only a fraction of the stocks previously available. In addition, 10 special halibut licences are issued annually to Indians who depend on halibut for a significant proportion of their incomes, but do not own the vessels they operate.

In 1982, the quota available to Canadian fishermen is 5.4 million pounds (compared to a catch of more than 30 million pounds 15 years ago), and because of low stocks, the catch rates have been very low. Furthermore, the landed price this year of $1.25 per pound is the same as the price of three years ago. Thus, the circumstances of the fishery have deteriorated sharply and are now critical. Recent trends are illustrated in Figure 10-1.

Figure 10-1 Landings and landed value of halibut since 1970



Sources: Fisheries Statistics of British Columbia. Department of Fisheries and Oceans, Vancouver, various years.

Halibut licences are issued annually at a fee of $10 to vessels that were licensed the preceding year and, except for the special Indian licences that are issued to persons, are transferable. They authorize fishing for halibut by hook and line gear (longline and troll) during the open season. A licensed vessel may be replaced the first time with another vessel up to 110 percent of the length of the vessel replaced, though second and subsequent replacements are limited by the foot-for-foot rule.

Incidental Troll Catch

A particularly aggravating issue relates to the treatment of halibut caught incidentally by salmon trollers. Trollers for chinook salmon cannot avoid hooking halibut occasionally in certain waters, even if they do not target on this species. Trollers who could show landings of 3,000 pounds of halibut qualified for "L" licences when they were initially issued. But in order to provide a larger catch to halibut longline fishermen who were displaced from Alaskan waters and to prevent additional catching capacity, the Department has since 1979 prohibited trollers from retaining their incidentally caught halibut and from adding longline gear specifically for halibut fishing. As a result, only trollers who hold "L" licences may take halibut and then, only during the open halibut season.

Many trollers who do not hold halibut licences feel aggrieved at having lost the privilege to retain incidentally caught halibut. The release of marketable fish makes little sense economically, and inevitably results in some mortality and waste. The present arrangements aggravate losses because the mortality of released fish depends upon the care taken in handling them, and having been denied the right to participate in the halibut fishery, salmon trollers have little incentive to release them with care. I find it difficult to disagree with the principle that fish caught should be landed unless there is a sound biological reason against it. Here, it is only a question of who catches them. But if trollers were allowed to retain halibut, a great deal more fishing capacity could be brought to bear in an already overcrowded fishery. Some advocate a return to a specific limit on retentions, but this is difficult to administer and, in any event, would not discourage trollers from targeting on halibut up to the prescribed limits. So none of these solutions is very satisfactory. My proposals below will resolve this problem.

Proposed Changes

Poor regulation of the halibut fishery has allowed the capacity of the licensed fleet to grossly overexpand. What is urgently needed now is firm action to rationalize the fleet to the available catch. In view of the current pressures on the fishery this will be difficult, but the longer it is postponed the more dislocation it will cause.

Fortunately, the characteristics of this fishery lend it well to a simple individual fisherman's quota system. The allowable catch does not fluctuate widely and can be (and is) predicted in advance of each season. A quota system is the only approach, as far as I can see, that offers any real promise in dealing with the alarming excess capacity in this fishery, and if it is carefully designed, it appears to offer a more equitable solution than any other.

I therefore recommend the following changes:

10. **Initial 10-year halibut quota licences should be issued in 1983 to owners of licensed halibut vessels that reported landings of halibut in 1980 or 1981. The quotas authorized under each licence should be related to the licensee's reported landings in those years.**
11. **The total allowable catch should be calculated for the north and west zones and a reserve of 10 percent set aside for appeals.**
12. **Initial licensees should be required to select the zone in which their quotas will apply, and licences should be issued accordingly.**
13. **Appeals should be considered from salmon trollers licensed to fish for salmon outside the Strait of Georgia who do not hold halibut licences and who can demonstrate that the limited-entry licensing of the halibut fishery adversely affected their incomes, and from halibut licensees who can demonstrate that the initial allocation of quotas would treat them inequitably.**
14. **With the total catch predetermined and limited through the authorized quotas, the fishing season should be expanded to the maximum period that biological constraints permit. Licensees should be free to take their quota on any hook and line gear. The longstanding prohibition against trawls should be maintained because they are undiscriminating and destructive to immature fish.**

These measures imply a substantial change from the traditional method of regulating this troubled fishery. Once in place, they should go a long way toward improved economic returns, fleet rationalization and simpler management and administration.

The proposed grandfathering in of licensees' quotas according to their recent catch shares appears to be the most equitable way of recognizing the difference between those who comprise the main halibut fleet and those who qualified for licences by way of incidental catches. The proposals are intended to secure the position of each, and transfers of quotas will provide an avenue for voluntary withdrawal from the fishery without loss or arbitrary intervention.

These arrangements will also alleviate the nagging problem of halibut caught incidentally by salmon trollers. Trollers will be free to acquire quota units as they see fit either by buying them from others or by bidding for them.

A major benefit of the proposed arrangements will be that the fishing season can be lengthened. This will enable higher prices for the catch because a higher proportion will be available for fresh fish markets, which bring prices about half again as high as the frozen market.

Experience elsewhere suggests that fishermen do not always take their full quota for one reason or another. Canada should therefore seek arrangements through the International Pacific Halibut Commission to provide for any Canadian quota not harvested in one year to be added to the Canadian quota for the following year.

These recommendations were originally proposed in my Preliminary Report. Halibut fishermen enthusiastically supported them, and the Minister subsequently announced his intention to adopt their main features. Indeed, U.S. halibut fishermen have pressed for adoption of the approach as well, and means of doing so are already being investigated. An advisory committee of halibut fishermen, appointed by the Minister to assist in implementing the proposals for the Canadian halibut fishery, has operated with remarkable efficiency, and within a few weeks completed its report to the Minister. Although specific details have not been decided as this is written, the new quota system is expected to be in place for the 1983 season.

The royalty proposed for halibut in Chapter 8, applied to the 1981 total allowable catch, would yield $540 thousand. This is, incidentally, roughly the amount of Canada's contribution to the International Pacific Halibut Commission. The Pacific Coast Fishing Vessel Owners Guild, which represents halibut vesselowners, did not object in principle to the proposed royalty, notwithstanding qualifications about the rate and the purpose to which the revenues would be put. Yet the Minister excluded this particular part of the proposal from his announced intentions, as he did with respect to the royalties proposed for other species except salmon. I regard the royalty as an essential adjunct to the licensing reforms to control, among other things, the appreciation of licence values (an effect which the Minister has also expressed an anxiety about). I therefore urge that the royalty on the quota be implemented without delay.

SABLEFISH

The sablefish, or blackcod, fishery has much in common with the halibut fishery, though it is much smaller and has grown conspicuously in recent years. The stocks are demersal; they are jointly exploited by Canadian and U.S. fishermen; and they are specifically fished using vessels with specialized gear. Moreover, the licensed fleet is grossly excessive.

Following extension of Canada's fisheries jurisdiction to 200 miles in 1979, and sparked by a sudden increase in fish prices in Japan, Canadian landings of sablefish quadrupled over two years to nearly 4,000 tonnes with a landed value of just under $5 million in 1981. But today the fishery is seriously depressed, and the main obstacle to improvement is that the fleet is several times too large for the stocks to support.

Sablefish are caught with a variety of gear, as Table 10-2 indicates. Most are taken in traps, and the top three trap vessels have accounted for almost half the total catch in recent years. A smaller number of longline vessels have sablefish licences, and they account for a modest share of the catch. Halibut longliners without sablefish licences are permitted to retain sablefish caught incidentally during the halibut open season. Groundfish trawlers are also permitted to retain catches of sablefish until the total allowable catch is reached and the sablefish fishery is closed. Trawl catches have been declining in recent years, however, averaging 244 tonnes since 1978.

Table 10-2 Vessels involved in the sablefish fishery in 1981

	vessels licensed for sablefish	vessels reporting landings of sablefish	share of total sablefish landings
	(number)	(number)	(percent)
trap vessels	27	15	86
sablefish longline vessels	20	9	6
halibut vessels	0	n.a.	3
groundfish trawl vessels	0	n.a.	5

Source: Department of Fisheries and Oceans.

There are three main markets for sablefish. By far the most important is the Japanese frozen fish market. To serve it, the product must be of uniform high quality, dressed to Japanese standards and frozen at sea. Smaller quantities are sold fresh and for smoking in local markets, at lower prices. Prices vary widely according to the quality and size of fish.

Until the late 1970s the Canadian catch of sablefish was modest. A Japanese longline fishery began to develop in the late 1960s and by the late 1970s was catching 3,000 to 4,000 tonnes off British Columbia. Vessels from the Soviet Union, Korea and the United States, as well as Canada, caught smaller amounts.

Before 1977, when Canada extended its coastal fishing jurisdiction, more than a hundred Canadian longline, trap and trawl vessels were landing sablefish, but only one trap vessel was occupied full time in the fishery. It had demonstrated that a specialized domestic sablefish fishery was feasible, but the investment required was substantial and the risk considerable. Clearly, the fishery could be expanded: the Canadian vessels involved were not capable of harvesting the allowable catch of 3,500 tonnes; and under the Law of the Sea, the balance had to be made available to foreigners. The Department estimated that the stocks could accommodate 10 to 15 specialized vessels.

This was seen as an opportunity when it became clear that Canadian fishermen would be excluded from the Alaskan halibut fishery. The Canadian halibut fishery was already overcrowded, but some of the larger halibut boats that had been fishing in Alaska could be readily adapted to fish for sablefish. So the Department offered assistance with the investment required to convert them for sablefish fishing under the relocation plan referred to earlier.

Licence limitation was contemplated in 1978 to ensure that the fleet did not overexpand but, as has usually been the case, it was left too late. A year later the Japanese market for sablefish burgeoned, and triggered a stampede into the fishery. The fleet was obviously overexpanding. Moreover, the prospects for those who had already made heavy financial commitments to this fishery were being undermined, and most of them had no access to other limited-entry fisheries. The Minister finally restricted further entry in October 1979, but by then 47 vessels had to be grandfathered in, even under stringent qualifying criteria relating to past landings and investments in sablefish gear.

Sablefish ("K") licences are issued annually for a fee of $10 to vessels that carried a licence the preceding year. The licence can be transferred with the vessel, but the foot-for-foot rule applies if the licensed vessel is replaced.

With three or four times the needed capacity licensed to fish the stocks, the sablefish fishery is now in serious difficulty. Only half the licensed vessels engaged in the fishery in 1981, yet the fishing pressure forced an early closure. Any improvement in markets can be expected to attract more fishing effort from the inactive licensees, which will offset improved earnings and force earlier closures.

Proposed Changes

In many ways, these circumstances are similar to those of the halibut fishery, and lend themselves equally well to rationalization through an individual quota system. The sablefish fishery is already managed according to an aggregate quota on the total allowable catch, currently at 3,500 tonnes, and this is very stable. Both trap and longline techniques are fairly slow and controllable catching methods, which will facilitate accuracy in meeting catch targets. Most of the catch is accounted for by a handful of vessels, which will simplify surveillance and enforcement.

I have already proposed procedures for distributing initial quotas, based on landings in 1980 and 1981. For these purposes, landings should be counted regardless of the type of gear or licence with which the catches were taken. A minor modification is called for to accommodate the historical catch of trawlers: to avoid the special complications that would arise from assigning each of them an individual quota, I propose that a small share of the total allowable catch should be reserved for the trawl fleet collectively, based on the historical catch of this sector. The remainder of the total should be allocated to sablefish trap and longline licensees and to halibut longliners who have been catching sablefish incidentally.

To implement these changes, I recommend the following:

15. **The total allowable catch of sablefish should be determined for each zone and allocated as follows.**
    - i) **A coastwide total of 250 tonnes should be allocated to the trawl fleet, split among the three zones according to historical catches in each zone. This allocation should not be embodied in individual licences.**
    - ii) **Five percent of the remaining total allowable catch in each zone should be temporarily held in reserve for appeals.**
    - iii) **Owners of vessels other than trawlers that landed sablefish in 1980 or 1981 should be issued new 10-year quota licences related to their reported landings in those years without respect to gear. They should be required to select the zone or zones in which their licences will apply and the remaining allowable catch should be allocated among them accordingly.**
16. **The fishing season for sablefish should be expanded to the maximum period that biological considerations permit.**

The sablefish industry should benefit substantially from these changes. Besides the benefits to be expected from a quota licensing system, some problems peculiar to the sablefish fishery will be alleviated. One is the shortened fishing season; with quotas totalling the allowable catch, seasonal closure should not be needed. Another is the hitherto discriminatory treatment of the several types of vessels involved, especially with respect to the participation of vessels without sablefish licences and the differing open seasons applied. Another is the halibut fishermen's longstanding complaint that they are not permitted to retain sablefish when the sablefish fishery is open and the halibut fishery is not, even though they historically did so. Such regulations will no longer be necessary; and with the recommended changes for the halibut fishery, they will be ineffective in any event.

FOOD AND BAIT HERRING

Herring have supported several more-or-less separate fisheries over the years. Until the mid 1960s the stocks supported a major fishery based on reducing the fish into meal and oil. More recently they have supported the large roe-herring industry discussed in the preceding chapter. And herring for human food, bait and other minor uses have all attracted fisheries with characteristic gear, seasons and products. Here I deal with the food-herring fishery and the smaller fishery for bait, which are closely integrated and conducted more-or-less jointly. Among the herring industries these fisheries are second in importance to the roe industry with landings in 1981 of almost 9,000 tonnes valued at $2.2 million.

The significant food-herring fishery that developed during the mid 1970s has since levelled off. Hopes of penetrating the high-value European market have not been realized for a variety of reasons, one of which has been the difficulty encountered by B.C. producers in matching the price and quality of product available from elsewhere, such as the Atlantic provinces. Recently, the main market has been Japan, where dried herring are sold as *migaki*. This year, markets for food herring are particularly weak.

Nevertheless, this fishery offers considerable opportunity. Herring are in their best condition for food in the late fall, when the major fisheries are closed. Consequently, this fishery can advantageously employ vessels, crews, shoreworkers and plant capacity that otherwise would be idle. Markets for food herring are extremely sensitive to quality but, with improvement in standards of fish handling and processing, at least some experts believe that this fishery has some good opportunities to penetrate markets.

A small proportion of the landings from this fishery is used as fishing bait, supplementing supplies obtained through special herring permits (described below). Halibut, sablefish, prawn and crab fishermen use herring as bait.

The food and bait herring catch is taken mainly with seine gear in the Strait of Georgia, where a much larger catch is taken from the stocks in the spring roe-herring fishery. Only small catches are taken in northern waters. The allowable catch can be determined well in advance because it represents only part of the stock's total annual yield and because, in the spawning cycle of the fishery, it is taken first. In 1981 the total allowable catch was 10 thousand tonnes, but this level will probably not be attained in 1982 because of weak markets.

This fishery is regulated under special ministerial permits issued to persons annually without charge, though each designates a vessel to be used in fishing. Permits are available to the holders of residual species licences ("C" licences described below) or other limited-entry licensees whose vessels are equipped with fish-cooling facilities and herring gear. This means that virtually all licensed vessels are eligible because even a box of ice qualifies as cooling equipment. With so many eligible vessels, the size of the fleet is uncontrolled.

In the last few years this fishery has become chaotic. A fleet with fishing power far in excess of that required to take the catch has converged on available stocks. In the Strait of Georgia, local fishery officers attempt to restrain daily catches to the estimated maximum daily plant capacity of 1,500 tonnes by shortening the fishing period. But in the face of a fleet with something like 20 times the needed fleet capacity in an area, the task has proven almost impossible. For example, fishery officers faced with a large stock of herring in Stuart Channel in 1980 tried in vain to limit a fleet of 100 seiners to a catch of 1,500 tonnes. In an opening of only 27 minutes, 4,000 tonnes were caught. As a result, landings far exceeded plant capacity, the 18-hour delivery rule (described below) had to be waived, and because of poor quality, a large proportion was unsuitable for food. This sort of chaos, inefficiency and waste is commonplace in this fishery.

Most of the regulations applied to the food-herring fishery are aimed at protecting the quality of the catch. In addition to having cooling facilities, each vessel must deliver its own catch; landings are restricted to 25 tonnes per delivery; and the catch must be delivered to a processor within 18 hours.

For the most part, the quality objectives of these regulations have not been met because access to the fishery is effectively unrestricted and because the fleet has expanded to the point where it has become unmanageable in the brief, frenzied openings. A seiner can often catch much more than 25 tonnes in a set, so if its delivery is limited to that amount it would have to dump the excess; instead, a vessel that makes a large set cooperates with others that make repeated deliveries to the processing plants, thereby thwarting the catcher-delivery rule. The requirements for refrigeration equipment have not been enforced, and some vessels have not carried it or used it appropriately. Finally, the policy of controlling catches by progressively shortening the opening time, while the fleet size remains unlimited, is both impractical and wasteful. In 1980, the most recent year for which this information is available, the food and bait-herring fishery was open for a total of only four hours. Catches cannot be properly regulated, gluts exceed plant capacity and large quantities of fish are spoiled.

This scheme has certain other disturbing features. It has effectively eliminated gillnetters and trawlers, not because they are any less suitable for food-herring fishing, but because the openings are so short they cannot take worthwhile catches. Indeed, the ability of these vessels to select only the large fish best suited for food, and to cool the catch rapidly, might otherwise give them an advantage. Similarly, some of the smaller processors, who prepare products for high-quality food markets, cannot now participate in the fishery because they are unable to obtain assured quantities of high-quality fish. Finally, the door has been left open to additional entrants by a commitment from the Department that past participation will not be a precondition for access to this fishery in the future.

In addition to these arrangements for the food and bait fishery, several kinds of special permits are issued for a variety of uses of herring, including sport or commercial bait, zoo and aquarium food, domestic food and charities, among others. The permits are issued to persons and authorize them to catch a specified quota. To be eligible for these permits, applicants must satisfy the Department that their use of herring will fit into one of these categories.

The present regulatory sytem is obviously inadequate, and the waste and inefficiency associated with the food-herring fishery should be tolerated no longer. Fortunately, the special circumstances of this fishery lend themselves well to reforms that would convert the licensing arrangements to a simple quota licensing system, which would significantly improve the performance of this industry. To this end, I recommend that the following steps be taken:

17. **The present ministerial permit system for authorizing herring fishing for food, bait and minor uses should be replaced in 1983 with a system of quota licences supplemented with temporary quota permits.**

18. **A total allowable catch to be taken in this fishery should be determined for any zone in which fishing is to be authorized.**

The Department's pledge that past participation will not be a condition for entering this fishery should be honoured, but it precludes allocating initial quotas according to recent catches, as I have proposed for other fisheries. In my Preliminary Report, I proposed that all eligible applicants should be allocated equal quotas, but I have since been persuaded that this would be too difficult to administer and that alternative methods should be used to reconcile the allocations with the general licensing policy I have already outlined.

I therefore propose the following special arrangements for allocating the allowable catch in these fisheries:

19. **One-tenth of the total allowable catch determined for 1983 should be allocated in new 10-year quota licences; the remainder should be allocated under one-year permits. In both cases the allocations should be made using sealed-tender bidding procedures. Eligible bidders for the 10-year licences should be limited to those who recorded landings in these fisheries in 1980 or 1981; bidding for one-year permits should be unrestricted. The amount of quota authorized in 10-year quota licences should vary to accommodate operations of differing requirements.**

20. **In each following year, an additional one-tenth of the current total allowable catch should be allocated under 10-year quota licences, the remainder under one-year permits, until the full allowable catch is licensed. Eligibility to bid for all of these subsequent allocations should be unrestricted.**

21. **Most of the present restrictions on this fishery should be abolished, notably the catcher-delivery requirement, the 18-hour delivery rule, the 25-ton limit per delivery, and the restricted opening periods. The present nine separate forms of special herring permits for particular purposes should be eliminated.**

These procedures involve a more abrupt transition to competitive allocation of fishing privileges than I have recommended for other fisheries. However, relatively few fishermen are heavily dependent on this fishery. For most, it is a season adjunct to other fisheries, and it does not involve heavy investment in specialized gear. The transitional arrangements I have recommended will give all those who have been promised participation in this fishery an opportunity to do so. They will also enable a cautious and gradual approach to the allocation of long-term licences, which is important in view of the economic uncertainties presently surrounding these fisheries. The initial royalties I propose in Table 8-1 are the same as those for roe-herring because both fisheries draw upon the same resources. As a general policy, the Department should allocate the available yields of herring among these fisheries in a way that will maximize their economic value.

Apart from the modifications noted, these recommendations were made in my Preliminary Report. The Minister has since declared his intention to pursue them, and has appointed a committee to advise on implementation. But he excluded from his announced intentions the levying of the proposed royalty. In this, as in other fisheries, the royalty must be regarded as the means to control appreciation of licences' market value and to return to the public a share of the value of resources used. So I reiterate the importance of providing for a royalty on quota from the outset of the new system of licensing.

Fixing the total catch through quotas and relaxing the tight restrictions on fishing time can be expected to result in much improved handling of fish and better use of vessel and plant capacity. Processors and fishermen will probably find it advantageous to contract for landings over particular periods to smooth operations and take best advantage of fish quality. In the more orderly fishing that will result, the fishermen should be able to improve substantially the quality of fish delivered and they should have strong incentives to do so. With fewer regulations of this sort, surveillance and inspections can concentrate on accurate recording of landings.

The number of vessels operating in the fishery will undoubtedly decline to a smaller and more appropriate number in relation to the allowable catch than has recently engaged in this fishery. Fewer vessels and fewer, larger landings should ease the burden of management and inspection.

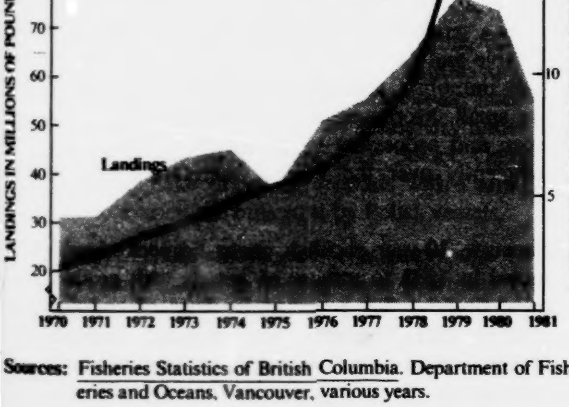
It is to be hoped that some licensees will experiment with gillnetting and trawling for food herring. With a longer season and assured opportunities to make a catch, they will be in a better position to test the superiority of these gears in terms of recoverable values, stock management and product quality. Small processors and special product producers should benefit from being able to guarantee buyers the quantity and quality of product they need, and from being able to contract with licensed fishermen to supply the herring.

With the help of the proposed advisory committee, the Department should consider certain additional measures for the future. One is a systematic grading system for the product to provide foreign buyers with better assurance of the quality of fish they are buying. Another is specifying quotas by areas within zones instead of attempting to manipulate the distribution of the catch by openings and closures.

GROUNDFISH

The groundfish fishery referred to here excludes halibut and sablefish, discussed above. It is limited to the trawl fishery that depends on other groundfish species, mainly Pacific cod but also rockfish, sole and a variety of other bottom fish. Like sablefish, the Canadian Pacific coast groundfish fishery has expanded significantly in recent years. Canadian landings have doubled since 1971, increasing fairly steadily until 1979, as illustrated in Figure 10-2. In 1980, some 32 thousand tonnes were landed by trawlers for a landed value of approximately $12 million.

Figure 10-2 Landings and landed value of groundfish other than halibut since 1970



Sources: Fisheries Statistics of British Columbia. Department of Fisheries and Oceans, Vancouver, various years.

Like both the halibut and sablefish fisheries, the groundfish trawl fishery is now depressed and structurally unhealthy, the licensed fleet having been permitted to expand well beyond the capacity required to efficiently harvest the available stocks.

Background

A Canadian groundfish trawl fishery has existed for more than four decades. It first emerged as a dogfish fishery in response to a strong demand for dogfish livers, which are a rich source of vitamin A. The market for dogfish gradually declined, but for foodfish species it expanded until the mid 1960s. At that time 80 Canadian trawlers were active, but only half were full-time groundfish vessels. They were mostly small vessels, only 10 of which exceeded 100 gross tons, and nearly two-thirds of their catch was Pacific cod. A fleet of U.S. trawlers from Washington State also operated off the Canadian coast and took about half the groundfish catch. Amercian vessels tended to operate in deeper waters and concentrated on rockfish, especially Pacific ocean perch.

Circumstances changed radically after 1965. In that year a fleet of 60 to 80 Soviet trawlers arrived, and over the following decade caught almost as much as the U.S. and Canadian fleet combined. They initially concentrated on rockfish (mainly Pacific ocean perch) but switched their attention to hake after 1968. Japanese trawlers fishing mainly rockfish, and longliners fishing blackcod, entered the fishery a year or two later, and were soon taking more than the Canadian catch.

In 1975 they were joined by Polish trawlers seeking hake and rockfish.[7] Since 1977 and the extension of Canada's fisheries jurisdiction to 200 miles, foreign fishing has been substantially phased out; the major remaining activity of this kind is a hake fishery, discussed below.

As foreign fishing was phased down, the Canadian groundfish fleet expanded enormously, stimulated by what were unnecessary and excessive subsidies. The vessel construction and improvement subsidies described in Chapter 13, coupled with tax incentives to construct fishing vessels, encouraged construction during the 1970s of large boats suitable for this fishery. In addition, the Minister introduced a price subsidy for groundfish in 1975. Somewhat contradictorily, further entry to the fishery was prevented by restrictive licensing introduced the same year.

Typically, entry controls were introduced too late. The capacity of the Canadian licensed fleet had been allowed (indeed encouraged) to expand to at least double the capacity needed to harvest the available catch. Having met the requirement of past landings, 146 vessels qualified for licences and were grandfathered in. More significantly, the average size of vessels engaged in this fishery has more than doubled since 1965, and the total tonnage of the active fleet has increased threefold.

The groundfish trawl ("T") licences are now issued annually at a fee of $10 to vessels that carried a licence the preceding year. They are transferable, and a licensed vessel may be replaced according to the foot-for-foot rule.

Today, this fishery is under extreme financial stress. The markets for groundfish species have declined. The vessels involved in trawling consume exceptionally large amounts of fuel, so that escalating fuel costs have had a particularly heavy impact on this fleet. This has been aggravated by vessel subsidies that biased construction toward larger, less fuel-efficient vessels. And most fundamentally, the stocks are insufficient to support the overexpanded fleet.

According to the Department, about 60 vessels fish groundfish six months or more each year. Because of the poor returns, many of the licensed vessels do not fish every year. These are typically licensed for other fisheries as well. Their abstention is undoubtedly beneficial, but the idle licensed capacity nevertheless poses a threat of increased fishery effort in future and is a major impediment to improving the long-term economic circumstances of this fishery. In the words of the trawlers organization —

> These inactive licences are a great threat to the fishermen who genuinely depend on trawl fishing for their living because as things get more difficult in other sectors, the inactive trawl licence holders move freely into the trawl fishery, thus aggravating an already growing problem. The serious potential problem here must be dealt with. . . .[8]

Proposals for Reform

The policies governing the allocation of groundfish fishing privileges clearly need to be improved, but the reforms must take into account the special features of this fishery. Besides those already noted, other characteristics should influence the nature of reform. First, some of the major species in this fishery are caught with more than one type of gear. For example, vessels with residual species ("C") licences (discussed below) catch well over one-third of the ling cod and a significant fraction of the rockfish and grey cod with hook-and-line gear. In the interest of effective resource management, a regulatory system should preferably embrace all users of the relevant stocks.

Second, this fishery depends on a mixture of species. Some of these inevitably are caught together, in which case it is appropriate that they be managed under a single regulatory system. But some of the major species such as rockfish, dogfish and hake are taken independently through fishing effort directed specifically to them. These call for separate regulatory arrangements, since each separable species has its unique yield capabilities and other characteristics.

Third, these fisheries are at present economically marginal and, at today's prices and costs, even if they were fully rationalized they would not be highly profitable. This implies, among other things, that this fishery ought not to be subjected to complicated and costly changes in regulatory arrangements.

These considerations lead me to conclude that the policies governing the groundfish fisheries should be reformed, but that the changes should be made gradually. The most important change is to provide for a separate licensing system for those distinct species that are independently exploited and call for independent management. The resulting proliferation of licences will likely be seen as a nuisance to fishermen, and so they should be as simple as the following recommendations allow. The most conspicuous species in this category are rockfish, dogfish, hake and pollock.

Rockfish Rockfish, mainly Pacific ocean perch, support a high-volume fishery producing a low-value product. They have become the base for the largest directed groundfish fishery, having expanded in recent years in response to strengthening markets in the United States.

The stocks were heavily depleted by foreign fleets in the 1960s and 1970s, and in order to rehabilitate them the allowable catches have been held low since they came under Canadian control. The small catch and the overexpanded fleet have resulted in the catch being taken quickly, the season having to be closed early, and processors having to cope with large volumes in a short period and to carry large inventories.

This fishery lends itself well to a quota licensing system. Rockfish are taken independently of other groundfish and so, like sablefish and halibut, can be treated as a separate fishery. The allowable catch is relatively stable and can be fixed in advance, the stocks are relatively immobile, and incidental catches of other species are small. Moreover, a quota system would enable fishermen and processors to spread the catch smoothly and efficiently over the year. I therefore recommend that—

22. Separate 10-year rockfish quota licences should be issued in 1983 to owners of vessels with groundfish trawl licences that reported landings of rockfish in 1980 or 1981. The quota for which each licensee is eligible should be related to his reported landings in those years.

23. The total allowable catch should be determined for each zone in which fishing for rockfish is to be authorized, and a small reserve should be set aside for appeals.

24. The intial licensees should be required to select the zone or zones in which their licences will apply and the allowable catch should be allocated among them accordingly.

25. The fishing season should be expanded to the maximum period that biological constraints permit.

Pacific hake Hake, regarded for many years as a trash fish, now supports an expanding trawl fishery. Biologists believe that a single large stock of hake extends along the open coast from California to British Columbia, and a separate smaller stock occupies the Strait of Georgia. These stocks support distinct fisheries, all regulated under groundfish trawl licences.

The domestic fishery in the Strait of Georgia takes place in the late winter. The largest share of the catch is caught and processed on board by a single processor-vessel, but other vessels deliver to a land-based plant and in recent years some have sold small catches fresh to consumers. Canadian land-based processors have been unable to compete in the large international market for hake. So far, landings have never approached the total allowable catch of 10 thousand tonnes, but catches have increased four-fold during the last two years, to 2,400 tonnes in 1981, and further growth is expected.

The prolific offshore stocks have a current allowable catch of 35 thousand tonnes, but they suffer more seriously from a parasite that causes the flesh to deteriorate unless it is processed quickly, a problem that has hindered development of a domestic fishery. Domestic landings from these stocks have nevertheless been increasing rapidly during the last couple of years and at 3,800 tonnes in 1981 exceeded the catch in the Strait of Georgia. These offshore stocks were fished heavily by fleets of foreign nations, especially the Soviet Union, before they were enclosed within Canada's extended fisheries jurisdiction. Under the new regime, Canada is obligated to make available to foreign nations any allowable catch that is surplus to domestic needs; hake is the only remaining species fished by foreigners under these arrangments. In 1981, Poland, the Soviet Union and Japan fished hake under agreements with Canada and took 3,500 tonnes, the bulk of it by Polish vessels.

Finally, offshore stocks are harvested through a unique arrangement referred to as the hake consortium. This is a nonprofit organization of domestic groundfish processors that organizes hake fishing for over-the-side sales to foreign factory ships, mainly from the Soviet Union, Poland and Greece. This activity began in 1978 with two vessels. By 1981 it had expanded to 14 vessels landing 18 thousand tonnes valued at $2.5 million. It is an increasingly attractive fishery, and there is a waiting list of vessels wanting to participate. However, participation is limited by the capacity of foreign factory ships.

The consortium negotiates prices with the foreign buyers and organizes fishing and orderly deliveries on a day-to-day basis. The participating Canadian fishing vessels must have a groundfish trawl licence.

The hake fishery, generally, is promising and can be expected to continue to expand rapidly. I am advised that arrangements with Japan may give a significant boost to this fishery. It clearly warrants special attention in the licensing system to ensure orderly growth. Since the stocks are fished and managed independently, a separate licence is warranted. The growing domestic fishery, especially, should be encouraged.

Accordingly, I recommend the following policy:

26. Separate 10-year quota licences should be introduced for hake in 1983.

27. The total allowable catch should be determined for each zone in which hake fishing is to be authorized.

28. Until the total allowable catch of hake has been fully allocated in any zone, 10-year quota licences should be issued without restriction to anyone who applies for them and pays the annual validation fees and royalties.

29. Once the total allowable catch has been allocated, replacement quota licences should be issued according to competitive bidding procedures.

The hake consortium has been a subject of conflicting views at the Commission's hearings, and it raises several separate questions. The basic issue is whether over-the-side sales to foreign buyers are in the public interest. The answer must be that they are, but only under certain conditions. If the fish would not otherwise be used, or if they would be used in a way that generates less net value to Canadians, over-the-side sales to foreigners are advantageous. This market provides a much-needed and promising opportunity for Canadian trawlers and their crews, and offers a means of developing Canadian knowledge about the occurrence of hake and techniques of fishing this species. These arrangements should not, however, be allowed to become so firmly entrenched that they prejudice the development of domestic processing.

A second issue is whether the hake consortium is appropriate for organizing such activities. Again, the answer should be a qualified yes. The present organization appears to have the expertise to negotiate suitable contracts with foreigners and to orchestrate the orderly fishing that furnishes steady deliveries to the buyers.

Because of the membership of the consortium, it can be expected to have an interest in ensuring that the enterprise will not dislocate domestic processing plants and shoreworkers. Moreover, participating vesselowners are represented on the committee that negotiates prices with foreign buyers. So unless there are reasons (which I am unaware of) to do otherwise, the consortium should be left to manage the fishing and marketing of fish as long as it does not violate Canadian anticombines legislation.

But no special privilege should be implied for this particular venture. If other organizations can secure contracts with foreign buyers and make similar fishing arrangements, they should be encouraged to do so, as long as the fish are otherwise unutilized. The licensing structure I have already proposed should adequately accommodate these arrangements.

Remaining are the provisions for foreign vessels to fish hake that are surplus to Canadian requirements. This issue concerns arrangements between Canada and foreign nations, which are beyond my terms of reference, and so I make no recommendations on this matter.

Dogfish and pollock Dogfish and pollock are the other two species that are now fished under the general groundfish trawl licence and warrant individual licences. Like hake, these species are fished and managed independently with allowable catches prescribed by regions, and they are underutilized. The 1981 catches of 1106 tonnes of pollock and 755 tonnes of dogfish represented less than 10 percent of the tentatively estimated allowable catches of both species. But both fisheries are expanding.

Dogfish are sold mainly as frozen fillets (under more appealing names) in Europe. They must be processed very quickly after being taken from the sea in order to avoid deterioration. These markets are expanding, and a fishery based on over-the-side sales to foreign buyers looks possible. These new markets should be encouraged; and if they materialize, the arrangements should follow those that I have proposed for hake.

Pollock are harvested in huge quantities off Alaska, where catches of up to 5 million tonnes are taken by U.S. and foreign trawlers. The main markets for this species are Japan, the Soviet Union and South Korea.

Both of these fisheries should be managed henceforth under specific licences. Accordingly, I recommend —

30. **Separate quota licences should be introduced for each of pollock and dogfish, under the same arrangements I have proposed above for hake.**

A new dogfish fishery should be encouraged for several reasons. The stocks are very large, and are believed to have increased substantially in recent years. They are heavy predators of herring, shrimp, salmon and other groundfish. And they may displace halibut in certain areas.[9] Thus, subsidies on dogfish have been advocated by some participants, but I cannot recommend this course of action unless the current trend toward an expanded fishery reverses and encouraging indications for future expansion wane.

Pollock, like other members of the cod family, are highly sensitive to changes in environmental conditions and as a result their abundance fluctuates considerably.

31. **The initial 10-year quota licences issued for pollock should be conservative, with additional catches in years of abundance to be provided for under 1-year permits.**

The initial royalties I propose in Table 8-1 for hake, pollock and dogfish are modest to allow these fisheries to expand. But until the full allowable catches are taken, quota allocations will be unrestricted (within the proposed limits on individual holdings), and so royalties will serve to discourage licensees from acquiring quotas in excess of their expected catches.

Other groundfish The other species of groundfish do not lend themselves as well to separate licensing arrangments. Some are inevitably harvested with others; the important Pacific cod is subject to such fluctuations in abundance that allowable catches cannot be reliably estimated at present; and most are not yet sufficiently valuable to warrant new licensing arrangements.

But a quota system would be beneficial in view of the overexpanded fleets and the threat of additional participation if this fishery's circumstances were to improve. The system should deal immediately with the problem of redundant and idle capacity, encourage subsequent fleet rationalization, and aid in the management of the stocks utilized.

I therefore propose that —

32. **Initial 10-year groundfish quota licences should be issued in 1983 to owners of licensed groundfish trawl vessels that reported landings in 1980 or 1981 of groundfish other than those species for which separate licences are proposed above. The quota for which each initial licensee is eligible should be related to his reported landings in those years.**

33. **The total allowable catch of these other groundfish species should be determined conservatively for each zone and a small reserve set aside for appeals.**

34. **Each initial licensee should be required to select the zone or zones in which his quota will apply, and licences should be issued accordingly.**

35. **Harvesting of temporarily abundant stocks should be provided for under one-year permits.**

36. The fishing season should be expanded to the maximum period that biological constraints permit.

Some groundfish vessels now roam coastwide, taking advantage of different species available in different areas at different times. Many of these are the highliners of the fleet, who will receive the largest quotas under the proposals. But the need for fishermen to switch from one area to another during a season is related to the overcapacity of the fleet. For example, today, with too many vessels competing for the available rockfish, the allowable catch is reached early in the season and the fishery closes, forcing the fishermen to look elsewhere. The rationalized fleet and more orderly pattern of fishing that can be expected to result from these proposals will eliminate that problem. In any event, under the above proposals, initial quota licensees will have an opportunity to determine how they will distribute their fishing effort.

SHRIMP

The value of the shrimp catch, though not the volume, has increased significantly in recent years. Landings brought average prices as high as 93¢ per pound in 1980 (a high year). The catch is taken with trawl gear and most is sold fresh. For most shrimp fishermen, this fishery is a part-time adjunct to others. The 61 vessels that landed only shrimp in 1980 accounted for only one-quarter of the shrimp catch.

Like most shellfish and crustacea, shrimp stocks and yield capabilities are not well known. They are difficult to assess partly because populations often occur together, they are often hard to find, and they fluctuate considerably. Stocks off the west coast of Vancouver Island have fluctuated especially widely; catches have fallen from more than 12 million pounds in 1977 to 600 thousand pounds three years later.

The current catch may be close to the maximum sustainable yield, but it is not evenly distributed over the coast; the stocks in certain areas, such as the Strait of Georgia, are believed to be overfished while those in other areas, notably the north coast and Barkley Sound, are believed to be underutilized.

In 1977, as shrimp landings in the offshore fishery rose dramatically and the fleet expanded excessively, the Department imposed limited-entry licensing on the shrimp trawl fishery. To qualify for a shrimp trawl ("S") licence, a vessel had to show evidence of landings during the preceding two years or of investments in shrimp trawling equipment. Two hundred and forty-four vessels are now licensed. In addition, special ministerial permits have been issued to vessels to fish for shrimp in northern waters where stocks are believed to be underutilized.

These licences are issued at an annual fee of $10 to vessels that carried licences the preceding year. Licensed vessels may be replaced by others subject to the foot-for-foot rule.

Restrictive licensing resulted mainly from concern about overexpansion of the fleet of large vessels operating off the west coast of Vancouver Island, but it applied coastwide. The large number of licences issued is the result of lenient entry criteria intended to accommodate the many small boats that had been operating in inshore waters, especially in the Strait of Georgia.

These licensing arrangements have locked in a fleet that is out of balance with the available catches. First, there are far too many licensed vessels for the resource to support. In most years nearly half of them record no landings; but, as in the groundfish industry, the excessive licensed fishing capacity presents a threat that will impede this fishery's healthy development in the future.

Second, in spite of the excessive number of licensed vessels, they do not take advantage of underutilized stocks in some areas such as the north coast. Many of the licensed vessels are too small for northern operations, and the vessel replacement rules prohibit their licences from being transferred to larger vessels.

Third, all but 17 of the vessels with shrimp licences carry licences for other fisheries as well; most carry salmon licences, but some combine halibut, herring and groundfish licences. Because the Department does not allow these licences to be "split" (i.e. all must be transferred together with the vessel), anyone wishing to fish in an underexploited area has difficulty acquiring a shrimp licence to do so.

Solutions to these problems can be found in a quota licensing system. This fishery lends itself well to such a licensing system, and to area licensing based on the three proposed zones and, indeed, to licensing by subzones within these. I therefore recommend —

37. Initial 10-year shrimp quota licences should be issued in 1983 to owners of vessels with shrimp licences that reported landings of shrimp in 1980 or 1981. The quota for which each licensee is eligible should be related to his reported landings in those years.

38. A tentative total allowable catch should be calculated for each zone, with a separate subzone for the area offshore in the west zone, and a reserve set aside for appeals.

39. Each licensee should be required to select one of the three major zones or the offshore subzone in the west, in which he will take his authorized catch.

40. Until the quotas allocated in the north zone absorb the total allowable catch there, new quotas should be available on application as I have recommended for hake, dogfish and other developing fisheries.

The total allowable catches should initially be fixed conservatively so that licensees will be reasonably assured of being able to achieve their quotas. The special advisory committee appointed for shrimp should also study, and advise the Department on, the opportunities for aquacultural leases for shrimp, perhaps in cooperation with advisors from the prawn fishery.

These changes should substantially improve the circumstances and outlook for the shrimp fishery. They will effectively eliminate the problem of excess licensed fishing capacity and incentives to recreate it. They will eliminate the controls and restrictions on the vessels used and the existing impediments to beneficial redistribution of other licences now linked to the shrimp fleet. They also provide means to achieve distribution of fishing effort better related to the yield capabilities of the stocks.

PRAWNS

The prawn fishery is much smaller than the shrimp fishery, but it has been expanding sharply in the last few years in response to prices that have tripled since 1976. Basic information about this fishery is very poor, but estimates indicate that by 1980 roughly 300 vessels landed some 800 thousand pounds of prawns with a landed value of $2 million. The catch is taken in traps, and a large proportion is sold fresh.

The stocks and their yield capabilities are only vaguely known. Biologists suspect that the catch may have reached its maximum, and the stocks in the more accessible areas, such as Howe Sound, have apparently been overfished.

The fishery is now managed without reference to any predetermined allowable catch but rather with reference to a minimum escapement of spawners. Like shrimp, prawns change from male to female as they grow older. As the fishing season progresses, samples of the catch are taken, and when the proportion of egg-bearing females falls below a certain level the area is closed until spawning is finished. But hitherto, monitoring has not been close or consistent.

Unlike the shrimp trawl fishery, special limited-entry licences have not been introduced for the prawn fishery. Any vessel with a residual species ("C") licence can participate, and so information on the number of vessels engaged in the fishery is poor. Finally, information on landings is weak. A few full-time vessels take a large share of the catch, but there are many part-time participants, mostly with salmon licences, who fish a small number of prawn traps. Much of the catch is sold fresh in small quantities, and the sales slips provided to the Department probably report no more than half the catch.

If policy followed the customary pattern, measures to control the fleet would be postponed until a danger of overfishing and excessive fishing capacity was clearly evident. The prawn fishery appears to have just reached this stage, and calls for a new licensing system now. However, the paucity of information about stocks, participants and landings make introducing quota licences unfeasible now. I therefore propose that a cruder form of control be introduced to limit further expansion of capacity for the time being.

41. **New temporary prawn permits should be issued in 1983 to owners of vessels that reported landings of prawns in 1980 or 1981, authorizing them to fish for prawns in 1983 and 1984 without specification of the catches authorized.**

42. **Holders of these permits should be required to select the zones in which their licences will apply.**

43. **During the 1983 and 1984 seasons, the prawn fishery should be managed by the current technique of closing areas as required to meet escapement criteria.**

44. **The monitoring of catches should be intensified and all permit holders should be required to report their catches in logbooks to be provided by the Department.**

45. **Before the 1985 season, total allowable catches should be calculated for appropriate subzones delineated within each of the three zones.**

46. **In 1985, 10-year quota licences should be issued to all holders of temporary prawn permits, and the amount of quota allocated to each licensee should be based on his landings reported in 1980 and 1981.**

47. **Each prawn quota licensee should be required to select for his licence one of the subzones delineated for this fishery.**

48. **Any remaining quota in any subzone after initial allocations are made should be available through competitive bidding for new quota licences.**

These arrangements will enable a smooth, though delayed, transition to a quota licensing system. In the meantime, with future quota allocations based on landings already recorded, further increases in fishing capacity that would otherwise result from rising prices or attempts to secure larger quota allocations should be forestalled.

CRABS

The dungeness crab fishery has much in common with the prawn fishery. It is also a significant fishery that is not subject to specific limited-entry licensing; any vessel with a residual species ("C") licence may fish for crab commercially. A few full-time vessels take most of the catch while the rest is spread among a large number of part-time operations, mainly off-season salmon fishermen. A substantial catch is taken by recreational fishermen as well. The value of crabs has risen sharply in recent years, to about $1 per pound in 1981 from half that only four years earlier.

In 1981, 358 vessels caught 1191 tonnes of crab valued at $2.6 million. Apart from a small quantity taken incidentally by trawlers, the commercial catch is typically taken in traps baited with squid imported from California or with local razor clams.

Like prawns, this fishery is not managed according to predetermined allowable catch limits; in this case the stocks are protected by a prohibition on taking crabs measuring less than 6½ inches across the back. Since females do not grow that large, and males breed before they reach that size, the biological viability of the stocks is maintained by this rule.

Crab is a relatively immobile species, and most are taken in three areas: the Fraser River, the west coast of Vancouver Island, and the Hecate Strait-Dixon entrance area. The fisheries are closed in the summer when crab shells are soft and their market value is low. For this reason crabbing complements the salmon fishery. While information is weak, catches are believed to have reached the sustainable yield of the stocks.

The crab fishery has become seriously overcrowded in recent years. Attracted by high prices for crab and increasing restrictions in other fisheries, more and more vessels have been fitted out with crab traps. The evidence of overcapacity is typical. While the number of vessels rose by 150 percent in the 5 years prior to 1981, the average catch fell by one-third. The problem is recognized by crab fishermen:

> . . . the crab fishery doesn't differ too much from the rest of the fisheries. There seems to be too many boats chasing too few crabs. . . .[10]

If this fishery is to realize its considerable potential, it will obviously need a more suitable regulatory framework.

This fishery lends itself well to quota licensing by zones. Suitably introduced, such an arrangement would secure the position of existing fishermen from further erosion by new entrants and promote rationalization of the already overexpanded fleet. Two special problems must be faced. One is the rather poor statistical record of landings. However, with the high proportion of the catch taken by a few vessels, for which data are relatively complete, this problem seems manageable. The other is that present information makes estimating appropriate allowable catches difficult; it will likely be some years before improved information will enable reliable calculations to be made. In the meantime, quota allocations should be held at or below catch levels of the recent past. Fortuitously, protecting the stocks by size regulations eliminates the risk associated with fishing beyond the stocks' sustainable yield.

I therefore make the following recommendations:

49. **Separate 10-year quota licences should be issued in 1983 to owners of vessels that reported landings in 1980 or 1981.**

50. **The quota authorized under each licence should be equal to the licensee's average reported landings in 1980 and 1981.**

51. **Initial holders of crab quota licences should be required to select the zones in which their quotas will apply.**

52. **The Department should improve its base of biological information for determining its allowable catches of crabs and regulate new quota allocations accordingly.**

These changes would provide a much more effective regulatory framework for the crab fishery, and enable it to become rationalized to the available catch. They would also afford certain other incidental benefits for this fishery. Under current conditions the major crab fishermen are under pressure to fish continuously — except when soft-shell closures are in effect — even during the winter months when rough weather results in heavy loss of gear and when crab production in the United States depresses prices. With individual catch allocations, regulated seasons would be unnecessary and fishermen could take their quotas whenever it was most advantageous to do so.

HERRING SPAWN-ON-KELP

The recently developed herring spawn-on-kelp fishery is exceedingly lucrative, and it holds great promise for expansion. In these respects it is similar to the abalone fishery discussed below. It is no coincidence that these two small fisheries, which have continued to sustain high profits, are also the two main examples of fisheries managed through an individual catch quota system. Had the allowable catch not been divided under quota among the licensees in recent years, these fisheries would undoubtedly have experienced the same overexpansion of fishing capacity and eroded returns observed in other fisheries.

Indians on the Queen Charlotte Islands traditionally harvested herring roe deposited on the kelp that grows near the low-tide line. But it was not until the early 1960s that Japan began importing the product from Alaska. Interest grew among Canadian fishermen and in 1975, after a successful experiment the year before, the Department began issuing permits. Unlike the Alaskan fishery, which markets naturally deposited roe, the Canadian permits authorize fishermen to impound spawning herring in ponds containing fronds of kelp strung on lines. This produces a superior product, and in the quality-sensitive Japanese market, it brings much higher prices.

Since 1979 spawn-on-kelp ("J") licences have been held by 28 persons, 18 of which are Indians. The licence is issued to a person and authorizes the holder to harvest a certain quantity of product; in 1982 all licences authorize production of eight tonnes. It must be harvested in enclosures and the location of these, the place where the kelp may be harvested and other operating requirements are specified in the licence. Licences are renewed annually at no charge, subject only to minimal landings requirements. Licence holders need not operate the catching vessel, but the licences are technically nontransferable. Operations are closely monitored, and the licensee must obtain the approval of the local fishery officer before beginning each stage of the production process.

While the licensing system has succeeded in preserving the economic viability of this fishery better than most others, it also provides a vivid example of the Department's attempts to allocate fishing rights to achieve vague social objectives. First, applicants for licences were selected by rating them according to complex point systems that credited, with varying weights, residence in certain coastal regions, participation in other herring fisheries and previous expressions of interest. Applications by Indians were given priority.

Second, the success of this fishery apparently led to concern that some licensees, especially those who also had roe-herring seine licences, would make excessive profits. So they were required to choose between these two fisheries, and spawn-on-kelp licensees (and even their crew members) were prohibited from engaging in the roe-herring fishery. Then, in an apparent attempt to be fair to these fishermen, the spawn-on-kelp quotas were adjusted in size in an effort to equate net earnings in the two fisheries.

These regulations are unnecessary and ineffective. Restricting spawn-on-kelp licensees from engaging in roe-herring fishing is a source of great irritation, particularly insofar as the reverse is not prohibited: roe-herring licensees and crew can and do become involved in spawn-on-kelp operations as catchers. In any event, licensees in both fisheries can engage in any of the other limited-entry fisheries if they obtain the necessary licences.

Fixing the size of quota allocations to licensees in a fishery according to their earnings in another fishery is an inappropriate policy. As prices and costs change from year to year, the relationship of profits between two fisheries is bound to change, so any effort to equalize profits over the long run will be futile. Today, for example, the average net return earned by spawn-on-kelp licensees is at least double that of roe-herring licensees. Further evidence of the futility of the policy is the observed value of spawn-on-kelp licences, which (although both they and roe-herring licences are technically nontransferable) is much greater than that of roe-herring licences. The policy should be, instead, to allocate licences of sufficient size that maximum returns can be generated in all fisheries. And the returns in excess of a reasonable profit to licensees should be captured through charges for the fishing privileges.

This industry is constrained by the number of licences and, although a huge production is technically possible, the Department has feared that the small Japanese market could be flooded. However, it is now believed that sales could be expanded somewhat without depressing prices.

To take advantage of these opportunities and to improve the framework for regulating this fishery I propose the following changes:

53. **Spawn-on-kelp licences should be replaced in 1983 with mariculture leases that designate specific areas of operations and have the other characteristics proposed (in Chapters 8 and 11) for this form of fishing privilege. The management plan approved under each lease should specify, among other things, the quantity of product to be produced.**

54. **Leases for new operations should be allocated through competitive bids, with no special advantage being given to existing licensees or other groups, except where the applicant controls the foreshore or, for other reasons, competition is unfeasible.**

55. **The current special restrictions on transfers of licences and on licensees' participation in other fisheries should be abolished.**

The need for the royalty recommended in Chapter 8 is particularly urgent, to recover for the public some of the fishery's substantial value and to moderate escalation in licence values. Licence fees have never been charged, apparently because the Department is reluctant to make additional levies on Indians. But these are exceedingly valuable privileges; they are costly to administer and monitor; and without significant royalties, their holders will realize undue windfall profits.

ABALONE

The abalone fishery is small but lucrative, and it presents promising opportunities for development through enhanced production. Its relatively healthy condition is not unrelated to its advanced form of licensing, which has quickly progressed from uncontrolled access, to limited-entry licensing, to the quota licence system that applies today.

Abalone are highly valued shellfish that are widely dispersed along the Pacific coast of North and South America. They are harvested mainly by divers operating from vessels.

The abalone ("E") licence was introduced in 1977 to restrict entry into a fishery that had developed suddenly, become overcrowded and was depleting the resource. Licences were issued at a fee of $200 to vessel operators who had landed more than $2,000 worth of abalone and earned more than half their fishing income from abalone in either of the two preceding years. After appeals were considered, 26 fishermen qualified for licences.

Initially, licences did not specify the catch that the holders were permitted to take, with predictable results in an increasingly valuable fishery regulated with open-ended fishing privileges. In the first two years the total catch exceeded a million pounds, well in excess of the sustainable yield. Some larger enterprises had landed more than 100 thousand pounds each. As the virgin stocks were run down, the catch had to be substantially reduced. In 1979 the coastwide allowable catch was fixed at 500 thousand pounds. The next year it was halved again to 250 thousand pounds. This current level may be roughly consistent with the sustainable yield.

The excessive fleet and the need to reduce the catch resulted in new measures to control operations. In 1979 one half of the 500 thousand pound allowable catch was exploited competitively in the early part of the year; the remainder was then divided equally to provide a catch quota to each licensed fisherman. Since 1980, the entire catch has been divided in this manner, providing individual quotas of 10,000 pounds in 1980 and of 8,000 in 1981 for each of the 26 abalone licensees.

The licence is issued to persons rather than vessels, but the licensee must designate the vessel he will use; and he must own a majority interest in the designated vessel. Only one licence is available to each qualifying fisherman, so that each quota is intended to be taken with a different vessel.

The basic structure of the abalone licence system is excellent. Since the licence is issued to persons and conveys the right to take a specified catch, it provides a direct mechanism for regulating the total allowable catch. Fishing can take place all year round, and restrictions on vessels and gear are minimal. Most importantly, this system has eliminated incentives for vesselowners to competitively expand their fishing capacity beyond that required to effectively take their quotas.

Nevertheless, the licensing system can be improved significantly. Some improvements can be made by simply removing certain unnecessary restrictions on licence holders. If the requirement that each licensee own a vessel and use it to catch his quota were strictly applied, this would force 26 vessels to operate in this fishery each year. This serves no useful conservation purpose and is economically wasteful, especially since the quotas are so small. Moreover, I see no justification for a licensing policy that requires fishermen to own the vessels they use in a fishery.

As the quotas have been reduced, some individual operations have been forced well below an economically efficient size. This has put a heavy strain on the system, and legal techniques have been found to circumvent the restriction that each quota must be exercised from a separate vessel. To solve this serious problem I recommended in my Preliminary Report, among other things, that these quotas be transferable, and that licensees be permitted to divide and combine them. Further, I proposed that the rule requiring licensees to own the vessels they use to fish for abalone be abolished. Since then the Minister has announced his intention to remove the restrictions on transfers of quotas. At the time of writing, no such changes have been implemented, however.

In order to enable this fishery to develop further, more fundamental changes should be made. The considerable potential for abalone production can best be realized under a system of management and utilization based on mariculture leases. The stocks are immobile and respond well to enhancement by techniques that are already well established, as I explain in the following chapter. Adopting a lease system would be a natural progression in the evolution of management for this fishery, for production from both wild and cultured stocks.

Mariculture leases would direct private incentives to develop opportunities for an expanded abalone fishery; they would improve the geographical pattern of harvesting; they would enable licensees to harvest the allowable catch without interfering with each other or competitively depleting certain areas; and they would shift much of the regulatory and administrative responsibilities from the Department to fishing enterprises.

Approximately two dozen abalone fishermen are now licensed, all of whom are experienced in the fishery and nearly all of whom belong to the recently organized West Coast Abalone Harvesters Association. These fishermen have now had four years of experience with the quota licensing system and have seen its benefits in eliminating tendencies to expand fishing capacity redundantly. Indeed, this fishery has recently shown a most untypical trend toward consolidation and fleet reduction through market processes and voluntary transactions, in spite of obstacles imposed by the government.

To overcome the present problems in this fishery and to promote the development of an expanded abalone industry, I recommend the following changes:

56. **Ten-year abalone quota licences should be issued in 1983 to current holders of abalone quota licences. The quotas authorized under these new licences should be equal to the quotas currently authorized.**

57. **The total allowable catch of abalone should be determined for each zone, and quota licensees should be required to select the zones in which they will take their quotas.**

58. **The existing restrictions on the transfer of licences, the division and combination of quotas, and the vessel to be used by the licensee should be abolished.**

59. **The Department should be authorized to issue mariculture leases for abalone.**

60. **With the help of the special committee of licensees appointed for the abalone fishery, the Department should delineate suitable areas for abalone mariculture leases to replace existing quota licences.**

These areas should be determined on the basis of their suitability as natural management units. They need not be equal in terms of their current or potential yields, nor need their number be equal to the current number of licensees. Rather, they should be structured so that each existing licensee can be allocated one or more leases capable of a rate of production approximately equal to his current quota. Beyond that, additional leases should be allocated by open competition.

Apart from these changes in the licensing system, other changes in abalone management policy should be considered. First, the method of protecting user groups from each other should be reconsidered. Currently, commercial abalone fishing is confined mainly to the proposed north zone. Seventy percent of the coast, including all waters south of Cape Caution are closed in order to reserve abalone for Indians, who have traditionally used this shellfish for food, and for sport fishermen. This is a crude and wasteful method of allocating access to stocks among users. Indian food fishermen and recreationists typically "pick" abalone from the intertidal zone while commercial fishermen harvest mostly by diving in deeper water below the low-tide line. The Department should therefore consider prohibiting the commercial harvesting of abalone above the low-tide level to preserve these areas for Indians and recreationists throughout the coast. Then, with commercial operations thus confined to deeper waters, commercial use of the available stocks could be permitted over parts of the coast now closed.

Second, to cope with a serious problem of poaching abalone for sale by unlicensed divers, the Department should make a special effort to enforce the licensing regulations. In this respect, I am encouraged by the recent trend toward stiff penalties for abalone poaching.

GEODUCKS

The commercial geoduck industry has had a short and buoyant history. It began in 1976, responding entirely to lucrative markets in Japan, which had already stimulated a geoduck fishery in nearby Washington State. By 1981 the Canadian harvest was close to 6 million pounds. This year prices reached more than 40¢ per pound, but the market outlook is clouded by quality problems.

Geoducks are a large species of clam. They are harvested by divers operating from boats that deliver the catch fresh to shore facilities, where they are then sent to a small number of processors and prepared for export to Japan.

Data on the stocks of geoducks are meagre, though the standing stock is undoubtedly substantial and has been estimated at more than 200 million pounds. The natural recruitment rate is very low, however, and geoducks grow very slowly over a life span believed to extend up to a century. This means that the sustainable yield is a small proportion of the stock.

In 1980, in the face of a rapidly rising catch of geoducks, an increasing number of vessels involved, and little knowledge about the potential yields, the fishery was subjected to limited-entry licensing. In 1981, there were 45 geoduck ("G") licences outstanding. Licences are issued annually at a fee of $10 to the vessels that carried licences the preceding year. The licences are transferable and a licensed vessel may be replaced only with a vessel of no greater length.

Unlike abalone, geoduck licences do not specify quotas, and the harvest a licensee may take is unlimited. The Department has therefore sought alternative methods of controlling pressure on the stocks. Despite little biological information, a total allowable catch of 6 million pounds has been set for the coast. Two million pounds is fixed for the north coast and 4 million pounds for the south. When the target is reached, the region is simply closed.

Although some fear that harvesting in certain areas exceeds the sustainable yield, certain characteristics of this fishery fortuitously protect the stocks from extinction. When the density of the stock in an area is reduced significantly, further harvesting becomes uneconomical, and in any event large stocks are found at depths that are uneconomic to harvest at all. But overharvesting particular areas may well reduce yields for a long period.

The distribution of the harvest is therefore a matter of concern. The Department has attempted to spread fishing pressure by manipulating openings and closures and by the separate allowable harvests for the north and south coasts. Southern areas have been more heavily exploited, but many of the licensed vessels are too small for northern waters and cannot be enlarged because of the vessel replacement restrictions.

This fishery lends itself to a progression from the present limited-entry licensing system to one based on individual catch quotas and, ultimately perhaps, to mariculture leases. In this respect, it is similar to the abalone fishery, though there are important differences: the management structure for the geoduck fishery has not evolved to the extent that it has for the abalone fishery; and geoducks are much longer lived and less responsive to enhancement.

Much can be gained from progressing immediately to a quota licensing system for this fishery, especially with respect to fleet rationalization and improved harvest distribution. I therefore propose the following measures be taken immediately:

61. **Initial 10-year geoduck quota licences should be issued in 1983 to owners of licensed geoduck vessels that reported landings of geoducks in 1980 or 1981. The quota for which each licensee is eligible should be related to his reported landings in those years.**

62. **A total allowable catch should be calculated for each of the zones and a reserve set aside for appeals.**

63. **Licensees should be required to select the zones in which their quotas will apply, and the new licences should be issued accordingly.**

64. **The management practice of closing areas should be discontinued; and, subject to conservation requirements, licensees should be free to take their authorized catches whenever it is most advantageous to do so.**

For the longer-term development of this fishery, the Department, in consultation with the geoduck licensees in each zone, should begin to identify appropriate geoduck management areas and their sustainable yields, with a view toward identifying mariculture lease areas for licensees' quotas in future.

The transition to quota licences will have several important benefits: it will eliminate incentives to overexpand fishing capacity; it will facilitate management and regulation of the catch by areas; and it will afford greater security to licensees. Geoducks are harvested by divers using a slow and easily controllable process, which, coupled with large stocks relative to annual harvests, will enable licensees to meet their harvest targets exactly.

Licensees will be able to pace their harvesting to best advantage, avoiding the competitive haste that has necessitated manipulating area openings and closures to achieve the target harvests and has led to occasional overharvesting of some areas because of difficulties in monitoring catches. Abolishing the restrictions on vessels would free those whose small boats confine them to southern waters to acquire the quotas and vessels that would enable them to utilize less heavily exploited northern stocks.

Individual quotas for this fishery present some special problems, however. First, geoducks (unlike abalone) are landed fresh and are delivered almost daily to shore facilities scattered along the coast; and this obviously complicates the task of monitoring landings. However, virtually all geoducks are exported through less than 10 processing companies, and this will facilitate surveillance of catches.

Second is the problem of dark flesh. Some geoducks have a dark outer skin, and although this does not affect the taste of the product it makes them difficult to market. Attempts to solve the problem by scrubbing away the dark colour by hand or by jets of water have been only partially successful. Processors have sometimes refused to buy dark geoducks and fishermen have been forced to dump them. Fishermen attempt to avoid beds with high proportions of dark geoducks, but where this is not successful they are typically dumped, with few, if any, survivors.

Obviously, if quotas are based on the total stock and licensees fill their quotas while discarding all dark geoducks, the total demand on them will be excessive. A solution to this problem is not obvious, but it is not one that is unique to a quota system. If dark geoducks prove to be unmarketable, estimates of the harvestable stocks and allowable catches should be reduced by the proportion of the stock that is not interchangeable.

TUNA

Albacore tuna range widely over the north Pacific, and Canadian waters host them sporadically in the summer at the most northern migratory extreme. They are found within Canada's 200 mile limit and in international waters further offshore.

High costs and unstable prices have discouraged Canadian fishermen from pursuing this species vigorously. Landings over the past five years have declined, although there are indications that vesselowners in the troubled salmon fishery might be attracted to tuna in the future. In 1981, 46 Canadian trollers landed 200 tonnes of tuna, fetching an average price of $2,000 per tonne (91 cents per pound).

Although supporting biological data for albacore is scant, it is estimated that a total allowable catch in the range of 100 to 240 thousand tonnes could be sustained in the north Pacific. Total annual catches by Canadian, United States, Japanese and Korean fleets are estimated at only about 75 thousand tonnes, leaving the stocks underutilized by a wide margin.

There are now no effective limits on the number of Canadian vessels that may fish for tuna; a vessel carrying a residual species ("C") licence or any other limited-entry licence may participate. But only salmon trollers have had the size, gear and mobility to pursue them. However, this year under special arrangements with the Department, five large vessels equipped with special gillnets plan to fish for albacore. This will test the suitability of gillnets for tuna, and throw light on the concern that incidental salmon catches might cause management difficulties if this kind of fishing were expanded.

Canada and the United States entered into an albacore tuna treaty in 1980 (after some friction between the two countries that came to a head in the preceding year). Under this treaty each country waived its 200 mile exclusive fishing zone for this species; vessels from each country may fish to within 12 miles of the other's coast. In addition, the treaty provides for reciprocal privileges for using ports and landing tuna, and for the reporting and exchanging of logbook information. In contrast to the long-standing halibut arrangements between Canada and the United States, the tuna catch is not allocated between the fleets from the two nations. Thus, both in Canada and internationally, policies for effectively managing this species are embryonic. At both levels the rule of capture applies.

In these circumstances, no purpose can be served by imposing catch quotas on Canadian fishermen. To do so would shackle the future development of tuna for Canadians while providing no corresponding benefits. However, the tuna fishery offers promising potential for absorbing some of the excess capacity in other fisheries.

I therefore recommend —

65. Until an international treaty is reached allocating the catch of albacore tuna, the Department should issue short-term permits for this species without restricting the number of licences or the total catch.

These licences should protect Canadian interests until such time as knowledge of the stocks is improved and international management arrangements become more sophisticated.

OYSTERS

Oyster culturing is the most conspicuous and successful example of mariculture on the Pacific coast. Indeed, until recent innovations in the herring spawn-on-kelp fisheries, it was the only one.

Japanese varieties of oysters were introduced in 1912 to Ladysmith Harbour and Fanny Bay on Vancouver Island. Because the young larvae drift hundreds of miles by ocean currents, they now occupy beaches throughout the coast, and have largely displaced native species.

Since 1912, oyster culturing has been administered by British Columbia under a federal-provincial arrangement. The province's special interest in this activity stems from its owning the intertidal zone (from high tide to low tide), where the oysters live. The federal government has delegated its jurisdiction to administer this species (as part of its jurisdiction over fisheries in general) to the province. These arrangements have remained largely unchanged since their inception. Thus, the federal Department of Fisheries and Oceans has not become involved with licensing oyster harvesting activities as it has for the other species described in this chapter.

The province administers oyster production through the Marine Resources Branch of the Ministry of the Environment. A system of leases and licences over foreshore owned by the provincial Crown convey exclusive rights to harvest oysters.

Leases are the more secure of the two forms of tenure: they reserve specific tracts of foreshore for shellfish culture; they are formally surveyed; they carry terms of up to 20 years; and they may authorize buildings and other improvements to be erected on the leased area. Licences carry terms of up to 10 years; they are normally granted in remote areas or to meet temporary needs of licensees, and do not authorize improvements. Both leases and licences may authorize harvesting of other molluscs, such as mussels and clams, as well as oysters.

Today, 271 leases and licences covering 1200 hectares of foreshore are outstanding. Holders of leases and licences must pay annual rentals of up to $75 per hectare, the amount depending on the size and productivity of the area. There are no quotas on the harvests or charges on the landings.

For a fee of $10, oyster permits are issued for harvesting wild oysters. A royalty of $5 per harvested ton is in place. Pickers are required to hold personal commercial fishing licences (described in Chapter 13) and must either hold an oyster lease or dispose of their harvests to a registered lessee.

Oyster culturing under leases and licences takes two forms. Traditional bottom-grown operations involve gathering "seed" from wild nursery areas or importing it from Japan and planting it on the foreshore, where it is normally harvested after three years. The recently introduced off-bottom culturing technique involves growing oysters in submerged trays suspended from rafts anchored off-shore. This method produces a high-quality product in two years.

Oyster production in British Columbia increased steadily during the 1960s, but harvests have been uneven, and in recent years they have declined. The 60 thousand gallons produced in 1981, valued at about $1.2 million, was significantly lower than the average of 88 thousand gallons produced in the 1970s, partly due to spawn (spat) failures. Most of the production is sold fresh or frozen in local markets.

The existing administrative arrangements for oysters appear to be generally satisfactory. Leases and licences convey exclusive long-term harvesting rights that encourage investments in stock management and enhancement, and already support a well-established mariculture industry. Changing only a few details would make these arrangements consistent with those I have proposed for mariculture leases.

The most serious problems faced in this fishery relate to the legal relationships between lessees and adjacent upland owners, the availability of spat, and the development of hitherto underused growing areas. These are technical problems that can be dealt with by the provincial authorities and do not impinge on the licensing structure itself. Delegating federal responsibility for this fishery to the province has apparently worked well and resulted in the most advanced licensing system among Pacific fisheries. Later, in Chapter 18, I propose that these arrangements be extended under a broad intergovernmental fisheries agreement.

CLAMS

Like oysters, the four species of clams found on Canada's Pacific coast — butter, littleneck, razor and manila — are found in the intertidal zone. They support regular commercial fisheries in some isolated coastal areas and more sporadic effort coastwide during the off-season for other fisheries. Recreational catches are estimated to be high, particularly in areas near population centres.

According to the sketchy information available, the maximum sustainable yield for all species could be as high as 3100 tonnes, as indicated in Table 10-3. Total annual catches currently amount to about one-quarter this amount, but these are unevenly spread geographically and by species. Coastwide, only the manila clam is being fully exploited, but depleted stocks are commonplace on accessible beaches in the Strait of Georgia. In an effort to conserve stocks, the Department closes overharvested areas to commercial fishing altogether. As well, it attempts to limit the recreational catch with a daily bag limit of 75 clams; south of Cape Caution, no more than 25 of these may be butter clams.

Clam prices are unstable as a result of fluctuating fishing effort and resulting market supply, and because of paralytic shellfish poisoning in some stocks.

Table 10-3 Volume of current landings and estimates of sustainable yields of clams

	landings[a]		sustainable yield	
species of clam	north coast	south coast	north coast	south coast
		(metric tons)		
butter	400	400	1,300	1,000
manila		225		225
native littleneck	(total coast: 350)		225	225
razor	80		100 to 125	

[a] Rough estimates for 1980.

Source: Assessment of Invertebrate Stocks off the West Coast of Canada. Department of Fisheries and Oceans. Technical Report #1074. Vancouver. 1981. pp. 11-22.

For manual operations, all that is required to harvest clams is a personal commercial fishing licence, which is issued without restriction at a nominal fee. Access to the fishery is therefore uncontrolled. The provincial oyster leases allow their holders to take incidental harvests of clams from their leased areas, but these arrangements lack a solid legal foundation. (It is proposed that mechanical operations will require special licences, but the eligible licensees will be effectively unlimited). The Department has made no provisions for culturing clams.

The clam fishery would benefit substantially from a more orderly management system based on mariculture leases. The Department's current licensing policy provides no opportunities for cultivating the resource or even private management of natural stocks, and this hampers unnecessarily the growth and development of industry. To remove this barrier, I recommend —

66. Clams should be licensed under mariculture leases that provide opportunities for culture and private management of wild stocks.

Because the foreshore is owned by the provincial Crown, the federal government's scope for encouraging clam mariculture is constrained. In Chapter 18 I suggest that marine fisheries like oysters and clams, that depend heavily on provincial jurisdiction over the foreshore, freshwater supplies and upland development should be administered by the province under a formal agreement. If this is done, the Department should discontinue licensing commercial clam operations and regulating recreational clam fisheries.

MINOR SPECIES

Over the last 15 years, one after another of the commercial species has been subjected to limited-entry licensing, as described in this chapter. Nevertheless, a considerable variety offer unrestricted access; these are listed in Table 10-4. Most of these support commercial fisheries.

Table 10-4 Minor species harvested under unrestricted licences

authorized under residual ("C") licences	**gear authorized**
crab (dungeness, red rock, graceful, king), shrimp, prawns, octopus	trap
rockfish, dogfish, skate, flounder and sole, lingcod, Pacific cod, surf and pile perch, turbot, tuna, sturgeon	hook and line
smelt, eulachon	set gillnet
authorized under specified species ("Z") licences*, with vessel	
clams (razor, butter, littleneck, manila cockles, softshell, horse)	mechanical digger or dredge
sea urchin	diving
squid	seine or hook and line
euphausiid, copepod	pelagic trawl
anchovy	seine
authorized under specified species ("Z") licences*, without vessel	
mussel, welk, winkles, top snail, limpet, goose barnacle	hand picking
octopus	hand picking and diving
smelt, eulachon	set gillnet
rockfish, lingcod	hook and line or spear from shore

* Proposed for 1982.

Source: Department of Fisheries and Oceans, Exhibit #143.

These species have little in common. The Department refers to them collectively as the developing species, but the term is not apt for all of them. Some of them are fully exploited, such as crab, shrimp and groundfish; and some, such as winkles, show no sign of developing. But in the past, as fisheries have expanded and threatened the capacity of particular stocks, the policy has been to remove them from this group and create separate, limited-entry licences for them.

Any of these species can be fished with a vessel carrying a residual species ("C") licence. This licence is a catch-all; it covers all fisheries not governed by specific limited-entry licences. It originated at the time salmon ("A" and "B") licences were created in 1968, and identified vessels licensed to catch species other than salmon.

These residual species licences are issued annually at a fee of $10 to vessels that held a licence the previous year providing that the vessel recorded a commercial catch of at least $500 in species not covered by other licences during the preceding two years. The licences are transferable, and a licensed vessel may be replaced only with a vessel of no greater length. A moratorium on new licences was invoked in 1976.

There are now 1054 licences outstanding. But the number of vessels eligible to fish these minor species is much greater than this since all vessels with licences to specific limited-entry fisheries, with the exception of those with either a roe-herring or a spawn-on-kelp licence, may fish residual species. Altogether, the Department estimates that there are 5,000 vessels authorized to fish these species under present policies.

These arrangements are obviously unsatisfactory. They effectively leave uncontrolled access to any of the minor species, inviting overfishing and excess fishing capacity as has happened so often in the past. In case after case (herring, sablefish, Pacific cod, shrimp, abalone and geoducks, among others), a sudden market opportunity has attracted too large a fleet and, by the time the Department has reacted with a new licence form, far more fishing power than the stocks could support has been grandfathered in.

The general residual species ("C") licence is therefore an unsatisfactory means of regulating the development of specific fisheries, and it does not enable proper management of the minor species it covers. Fishing effort directed toward them tends to fluctuate unpredictably in response to the fortunes of the salmon fishery, increasing dramatically in poor salmon years. Most of these stocks are small, and a relatively small increase in the fraction of the eligible fleet directed to them can have a very heavy impact. So can a relatively minor shift in the target species. Such events cannot be controlled under current licensing policy.

In search of better arrangements, the Department plans to introduce a selected species ("Z") licence this year. These licences will have most of the features of the residual species ("C") licence except that they require the licensee to specify in advance which species he will fish. This will enable the Department to identify and monitor participants in particular minor fisheries. But they afford no means of coping with the basic problem of controlling access because all commercial fishing vessels will be eligible. The licences to cover fishing without a vessel, shown in Table 10-4, will be available to all holders of personal commercial fishing licences, which are totally unrestricted in number.

Clearly, a better regulatory system is needed for minor species. I have already proposed new licensing arrangements that will remove from this category all the crab, shrimp, prawn and groundfish. These account for the bulk; the remainder in Table 10-4 support very small fisheries. For them I propose the following:

67. All other minor and unrestricted fisheries should be administered in future under short-term quota permits that identify the particular species or group of species that the licensee is authorized to catch. These permits should —

i) Designate the north, west or south zone at the holder's choice (as long as the stocks are underutilized). For the less mobile shellfish and crustacea, particular subzones should be designated. Where it serves a particular biological purpose, the gear to be used should also be specified.

ii) Specify the quantity of fish that its holder is authorized to catch. For those species that do not warrant restrictions on the harvest, permit holders should be free to designate the quantity to be authorized within only the general limits on individual holdings (proposed in Chapter 8).

68. The residual species ("C") licence should be abolished since it will no longer serve a useful purpose.

Many of these species are shellfish and other forms that lend themselves well to mariculture leases. But few of them are sufficiently valuable to warrant sophisticated licensing arrangements. Nevertheless, wherever it appears economically justified, the suitability of mariculture leases should be considered for these small fisheries also.

FOOTNOTES

1. Department of Fisheries and Oceans, Exhibit #143, p. 41.
2. For an historical account of the development of the halibut fishery, see B.C. Cook and P. Copes, Rationalization of Canada's Pacific Halibut Fishery. Institute of Fisheries Analysis, Simon Fraser University, Discussion Paper 81-12, Burnaby, 1981; and James A. Crutchfield, The Pacific Halibut Fishery. Economic Council of Canada, Technical Report No. 17, The Public Regulation of Commercial Fisheries in Canada, Ottawa, February, 1982.
3. Revised Statutes of Canada 1970, c. F-17.
4. See B.E. Skud, Jurisdictional and Administrative Limitations Affecting Management of the Halibut Fishery, Ocean Development and International Law Journal, Volume 4, 1977. pp. 121-142.
5. Annual Report. International Pacific Halibut Commission, Seattle, various years.
6. Figures provided by the Department of Fisheries and Oceans.
7. T.B. Proverbs, Developments Signal End For Foreign Fishery, The Sounder, Volume 9 No. 7, October-November, 1981.
8. Deep Sea Trawlers Association, Supplementary Document #S-36, p. 2.
9. W.E. Johnson, B.C. Fisheries, The Potential and the Future, in Summary of Presentations at the 31st Annual Meeting of the Fisheries Council of Canada. Fisheries and Marine Service, Ministry of Environment, Vancouver, 1976; and B. Jones and G. Geen, Food and Feeding of Spiney Dogfish (*Squalus acanthias) in British Columbia Waters, Journal of the Fisheries Research Board of Canada, Volume 34 No. 11, 1977. pp. 2067-2078.
10. Masset Crabbers, transcripts of the public hearings, Volume 63, p. 13270.

CHAPTER 11

MARICULTURE AND OCEAN RANCHING

There is a need to develop a new alternative in the fishing industry to provide an opportunity for a gradual evolution to a system we are defining here as the "Mariculture Lease Concept," in which fishermen will manage and enhance, as well as harvest, salmon and other marine resources. This represents a significant change; a transition from the hunting strategy and philosophy of the present catch fisheries to a farming strategy and philosophy.

D.W. ELLIS[1]

Throughout this Commission's hearings, many participants expressed a keen interest in mariculture and ocean ranching opportunities. Certainly Canada's Pacific coast, with its many sheltered inlets and bays and relatively pollution free waters offers ideal conditions for such ventures. Interest has been stimulated also by the search for an alternative to the wasteful and inefficient patterns of resource exploitation that characterize our present commercial fisheries, and by recent developments in the technology of fish culture.

Mariculture is relatively undeveloped in the Pacific region, and so this industry presents a refreshing contrast to the intractable problems of the established commercial fisheries. Moreover, the prospects for mariculture and ocean ranching appear promising. Unlike most of the existing commercial fisheries, they offer considerable scope for expanded, stable and less seasonal employment. Because of their physical requirements, they also provide an opportunity for developing a more secure economic base for coastal communities. Much of the technology required is already proven, and is advancing rapidly.

In the long run, fish culturing, farming and ranching could well support prosperous food production industries that would provide more opportunities for many Indian and other communities than traditional fishing; and if well organized, they would complement existing fisheries. The challenge is to provide a framework of regulatory policy that will promote these opportunities. In this chapter I review recent developments and emerging opportunities in this field, and recommend policies for accommodating new ventures without disrupting natural fish stocks or those who depend on them.

While developments in fish culture should be encouraged, I emphasize that governmental policies should be designed to promote orderly, measured growth to avoid the chaotic responses to new opportunities that have recurred in so many other commercial fisheries. Mariculture and ocean ranching are in their infancy; they present new technical and organizational problems; and they call for careful, coordinated developmental planning.

I use the word aquaculture to refer to the culturing of plants and animals in any water environment, and mariculture to refer to culturing them specifically in marine (or salt) water. Fish farming refers to the production of fish entirely within enclosures in either fresh or salt waters. Ocean ranching applies to ventures that involve culturing, releasing and recapturing salmon.

MARICULTURE

Aquaculture has a long history in many other countries, especially in Asia and Europe. Recently, new industries based on fish farming have burgeoned in Japan, and in Norway and other European countries.[2] On Canada's Pacific coast, commercial fish culturing has been limited mainly to oyster production; but the rich physical environment for mariculture in this region and the variety of species that are amenable to artificial culture have recently attracted a much broader interest. The following paragraphs summarize some of the emerging opportunities.

Shellfish Culture

Interest in culturing shellfish extends to a considerable variety of species, but so far experience is limited to oysters, and pioneering projects and studies of others. For most we know only that they can be cultured; the economics of production and problems of marketing remain uncertain. The most promising species are oysters, abalone, clams, mussels and scallops.

Oysters Oyster culturing is a small but well-established industry, described in Chapter 10. Local markets can probably absorb more than the current production, and possibilities exist for expanded export sales as well. The provincial oyster leases provide a generally satisfactory administrative structure for this industry. The technology of production is also well established, and new suspension culture methods may enable producers to increase output substantially, to perhaps 50 times present levels.[3] So if markets are sufficient, oyster culture could become a significant coastal industry.

Abalone The culturing of abalone is well established in Japan; but in British Columbia, only a single private pilot project has been developing for several years. It includes research, supported by the Department, into alternative production techniques. The project has demonstrated the biological feasibility of abalone culture in this region, and though the economics appear promising as well, they have not yet been proven.

Interest in abalone culture is growing rapidly. Markets are apparently strong, having absorbed more than a million pounds of production from wild stocks in this region before the allowable catch was reduced, as explained in the preceding chapter. Culturing offers a means of producing both a marketable food product and immature abalone for stocking natural beds. If abalone culturing proves economically rewarding, production of several million pounds annually might well be achieved.

> At present we have a very wasteful system, wasteful in that it underutilizes the natural abalone in much of the coast. But even worse is that it does not tap the vast potential of abalone mariculture. . . .[4]

To allow this industry to develop, I recommend in Chapter 10 that mariculture leases be issued to promote systematic management and harvesting of both wild and cultured abalone.

Other shellfish The culturing of clams, like abalone, offers opportunities to complement production from wild stocks. The prospects for culturing manila clams are especially encouraging.

Mussels have been cultured in Europe for many years. On the Pacific coast, the demand for this species is limited and commercial harvesting is apparently not threatening wild stocks. However, European experience suggests the higher-quality product cultured artificially would expand market demand.

Scallops occur naturally on the Pacific coast, but the stocks do not lend themselves well to commercial exploitation. Mariculture offers a more promising possibility for producing scallops, at least in sufficient quantity to meet the local market demand, which is now served by Atlantic producers.

Two years ago a pilot project, supported by the Science Council of British Columbia, was initiated to test the feasibility of alternative techniques for culturing scallops. The provincial Marine Resources Branch has worked closely with that project and has been researching a range of problems of scallop culture.

The shellfish mentioned above are those in which mariculturalists are most interested, but other species may lend themselves to culture as well. Most of these shellfish can be readily produced in the same or complementary facilities; oysters, clams and mussels, for example, are produced together in some other countries, and this practice is being tested here.

Salmon Farming

Pen rearing of salmon has attracted considerable interest in British Columbia, and several ventures of this kind are now operating. The Department's Research Branch has played an important role in developing rearing techniques.

The financial performance of salmon farming operations has been mixed. At the time this was written the largest of them was in receivership. However, others remain optimistic, and believe that salmon culturing will become an important industry.

> That the salmon farming industry is already developing in British Columbia is obvious. The risks and initial costs are extremely high, the time lag between egg and market stages is long, and government involvement is limited, if not obstructionist in certain regards. In spite of this, interest from both the general public and those who wish direct involvement is growing rapidly. New technology, advancing culture technique, knowledge of nutrition, disease controls and coastline of rich potential all offer positive prospects for a self-sustaining new industry.[5]

A major obstacle to development of this fish farming industry is the complicated and overlapping regulatory requirements of the federal and provincial governments, which I return to below.

Other Possibilities

Methods of culturing other species are likely to develop in the future. Experiments are already being done on pen-rearing sablefish, and interest has been shown in culturing other species of clams, shrimps, prawns, crabs and marine plants.

Developing Interest

For some years the Department's research establishments have conducted basic and applied research in fish culture. Recently, the Department of Indian and Northern Affairs responded to the interest of coastal Indians in the economic opportunities of mariculture by establishing an Indian Mariculture Task Force. Its objective is to design a program for involving Indians in developing mariculture and fisheries based on minor species. A workshop attended by Indian representatives, mariculturalists, and specialists from the federal and provincial governments was held earlier this year to explore these possibilities.

The Department of Regional Economic Expansion recently struck a Marine Resource Industry Development Steering Committee with representatives from six other federal departments including the Departments of Indian and Northern Affairs and Fisheries and Oceans. A discussion paper produced by the committee considers the opportunities for developing mariculture and is particularly concerned with the regulatory framework for this industry.

The government of British Columbia, through the Marine Resources Branch of the Ministry of Environment, has been administering oyster culture for many years, as explained in the preceding chapter. It also conducts research on the maricultural possibilities for shrimps, prawns, scallops and other shellfish. The branch is currently assessing areas suitable for mariculture with a view toward protecting them from incompatible activities.

The provincial Ministry of Industry and Small Business Development, under an agreement with the federal Department of Regional Economic Expansion, is involved in promoting mariculture as part of a program to encourage small processing and manufacturing businesses. Last year this program supported a series of workshops on mariculture with participation from governments, universities, and the mariculture industry. The province provided more tangible support for mariculture ventures last year by making them eligible for loan guarantees up to $300 thousand under its Agricultural Credit Act.

Growing private interest in mariculture recently resulted in the formation of the Mariculture Association of British Columbia to promote members' interests and provide a channel of communication to governmental authorities. The earlier established British Columbia Oyster Growers' Association is an associate member of this new association.

Policy Directions

Present regulatory provisions for mariculture involve both the federal and provincial governments through a variety of departments and ministries concerned with industrial development, land-use planning, water resources, Indians, regional programs, environmental protection, as well as fisheries resources. The present regulatory arrangements are now complicated and overlapping, and both governments have recognized that their uncoordinated programs and policies are an obstacle to mariculture development. In Chapter 18, I recommend that their respective roles in mariculture be reconciled under a general federal-provincial agreement on Pacific fisheries. Under the agreement the province's formal responsibilities for administering mariculture licences could be expanded beyond its current oyster leasing program.

However, the federal government will undoubtedly continue to take responsibility for many species amenable to mariculture, particularly those that do not depend heavily on provincially owned land and other resources. Accordingly, the Department of Fisheries and Oceans will have a continuing role to play in realizing opportunities in mariculture. Thus, I recommend that —

1. **The Department should promote the development of mariculture on the Pacific coast by providing technical support and a system of mariculture leases.**

The features of the required leases are dealt with later in this chapter.

OCEAN RANCHING

Ocean ranching involves releasing young salmon to the sea and harvesting them on their return as adults. This dependence on the open sea distinguishes ocean ranching from mariculture or pen rearing, where salmon are confined until marketed. While interest in salmon ranching has grown in recent years on the Pacific coast, considerable controversy surrounds experiments with these techniques elsewhere and the opportunities available here.

Experience Elsewhere

Experience in ocean ranching in Canada is limited. The Salmonid Enhancement Program, described in Chapter 5, produces large numbers of young fish. Most of the harvest is taken in the traditional commercial, sport and Indian fisheries, but in a few cases some is taken at the enhancement facility itself. So far in Canada there are no private, commercial ventures of the kind I am concerned with here.

Japan has long experience in ocean ranching, and has a burgeoning industry based mainly on artificial propagation of chum salmon by local organizations of fishermen, who also harvest the returning fish. In the United States ocean ranching developed as an outgrowth of pen-rearing ventures. Most experience has been in Oregon, where ranching has been authorized since the early 1970s. Twelve ocean ranches are now operating. These are mostly very large, releasing millions of fish and relying on a small fraction returning to provide enough revenue for profitable operations. The ocean ranching operations do not have exclusive rights to harvest the stocks they produce, which are subject to exploitation in both the commercial and sport fisheries. Some of the experience with ocean ranching in Oregon has been discouraging: operators have encountered a variety of problems; none have yet been able to sustain their planned output; and few have profited.[6] Presently one ocean ranching venture is operating in California, on the same basis as those in Oregon.

Alaska's approach to ocean ranching is quite different. There, legislation in 1974 authorized private hatchery operations by nonprofit corporations for the primary purpose of producing salmon for the established commercial fishery. The facilities are to be located in areas where the returning salmon can be reasonably segregated from natural stocks. The fish are exploited by the commercial fleet, and special harvest areas are established near the production facilities. Harvests in these areas are controlled by the hatchery operators, who are permitted to take enough fish to cover their costs. If there are any surplus stocks once these costs have been met, the area must be opened to the commercial fleet. So far six such corporations have been established, only two of which have produced substantial numbers of fish. The state government has provided financial assistance; and, in at least one case, revenues from fish sales have been supplemented with voluntary assessments on fishermen and matching funds from processors.

The State of Washington, like Canada, has so far not authorized any private ocean ranching ventures. But salmon from this region have been introduced for ocean ranching projects as far away as Chile.[7] My review of the experience so far with salmon ranching has raised several concerns. One is the uncertainty of success in obtaining sufficient returns of fish to make the ventures profitable.[8] Another has to do with biological questions about the selection of brood stocks, genetic impacts on wild stocks and the spread of diseases. These are parallel to concerns about the Salmonid Enhancement Program reviewed in Chapter 5, and because experience is so limited they are very difficult to evaluate. Another is about whether large populations of artificially produced fish can be harvested without adverse effects on natural stocks mixed with them.

Directions for Policy Development

The approaches taken in the United States do not, in my opinion, offer satisfactory models for Canadian policy development. In both Alaska and Oregon, operations are hampered because they are not given any special privileges over the fish produced. Objections to such ventures having exclusive harvesting rights near their facilities have been influential in Oregon, and apparently explain Washington's reluctance to approve any ocean ranching so far. And in Alaska, harvesting by the facility operators is restricted to the level required to cover costs.

These policies aggravate two problems: they lower the financial returns and increase the risk to ranching operations, and they impose more fishing on mixed stocks. To minimize interference with natural salmon stocks, the enhanced stocks should be harvested as close to the production facility as possible. In my judgement, two other characteristics of U.S. approaches should be avoided here also: one is their emphasis on large-scale operations (which aggravate biological and fishing problems); and the other is their exclusive concern with artificial production.

I am receptive to proposals for ocean ranching made by participants in the Commission's hearings, since they, by and large, met these concerns and embodied other desirable features as well.[9] First, most proposals involve small-scale operations at sites to be carefully selected on the basis of criteria developed by the Department.

> . . . the approach proposed here assumes that DFO will still have authority for the biological control of . . . projects; this responsibility will not be left in the hands of private parties.[10]

Second, the proposals call not only for opportunities for private development of hatcheries but also for opportunities and responsibilities in habitat management and enhancement:

> . . .with the important additional feature that adults would be the product of enhanced natural systems, with habitat and stock management governed by SEP standards and objectives at all times.[11]
>
> It seems likely therefore, that if salmon ranching is to be introduced, it should be coupled with stream enhancement and that individual sites be limited in size.[12]

Third, they allow for some of the enhanced fish to be taken in the traditional common-property fishery, so that the established commercial fleet will benefit from these operations.

> It is likely that many fish . . . would be caught externally in common property fisheries elsewhere . . . to be attractive to the private investor it is only necessary that sufficient fish return to be caught in the designated fishery and yield an acceptable return on investment. . . .[13]

Finally, through licensing arrangements that enable the operator to control the catch in a terminal area, these proposals provide opportunities to harvest the fish in the most economic way possible.

> . . . there would be a clear incentive to harvest fish at least possible cost, which the licence

> holder could pursue in the knowledge that fish in the designated fishery belonged to him alone. In short, the licence holder's main concern would be to have just the right amount of fishing power at hand to make the prescribed catch, at lowest possible cost, . . .[14]
>
> . . . the sponsors will be able to maximize their revenues and possibly their local employment through researching alternative ways of harvesting. . . .[15]

I find these features of the proposals for ocean ranching most attractive; particularly, the opportunities to harness private initiative and ingenuity in producing fish, linking those who would incur the costs directly with those who would benefit. Policy should encourage cautious developments in ocean ranching along these lines and enable opportunities in this new field to be pursued.

I therefore recommend —

2. **The Department's program for maricultural leases should include ocean ranching operations based on development of natural stocks and artificial production.**

For the immediate future, I suggest that only a few modest ventures of this kind be approved to test their feasibility and the system for regulating them. Thus —

3. **For the time being and until the feasibility of these ventures and the regulatory method is demonstrated, the Department should approve only a few maricultural leases involving ocean ranching operations as pilot projects.**

The approved pilot projects should be designed to demonstrate that these ventures can benefit, rather than impinge upon, established commercial fisheries and should provide for close monitoring and control by the Department.

Each should be based on a maricultural lease over a bay or inlet of modest scale, with the lease having the characteristics described later in this chapter. Lessees would have the exclusive right to harvest fish in the prescribed area and the obligation to conduct enhancement, management and protective functions as set out in the management plan approved by the Department. The enhancement would include developing natural stocks in streams entering the sea in the lease area as well as producing fish by approved artificial techniques. The operations should be designed and located to minimize interference with established commercial fisheries, and preferably to augment the commercial catch.

MARICULTURE LEASES

In Chapter 18 I identify the overlapping interests of the federal and provincial governments in mariculture, and recommend that their respective roles be clarified in a federal-provincial agreement. For species to be administered by the province, the design of leases should be left in provincial hands. But for those under federal control, the Department must develop leasing arrangements that will offer the requisite management incentives to their holders and provide the Department with the necessary supervisory controls.

Leases must be developed for both mariculture and ocean ranching operations. And within each of these general categories, appropriate provisions should be incorporated into leases to reflect the unique nature of the species involved and their management requirements, leaving wide scope for variations among them. Nevertheless, they should share certain common features.

I pointed out in Chapter 7 that the essential feature of mariculture leases is that they confer rights over a defined geographic area. In Chapter 8, I proposed that leases have certain general characteristics: that they be allocated through competitive bidding (unless a proposed project is feasible only for a particular applicant); that they be issued for specific terms; that they specify the quantities of fish to be harvested; that they carry an obligation to pay royalties on the authorized harvest; and that they be transferable with the approval of the Minister. These basic provisions are consistent with other recommendations in this report concerning limited-entry and quota licences. To accommodate developments in mariculture and ocean ranching the Department should incorporate these features into provisions for mariculture leases.

Thus I recommend —

4. **Mariculture or ocean ranching operations should be authorized by the Department under mariculture leases. Each mariculture lease should designate a specific area in which its holder has the exclusive right to harvest and manage specified species of fish.**

The lease area for ocean ranching operations might include a small bay or inlet adjacent to the rearing facility, where its holder would be able to harvest his catch efficiently and without interference from others.

The Department will need to approve fisheries management, enhancement and harvesting plans under mariculture leases, to ensure that they are biologically and technically sound and assign responsibilities to lease holders. The leasing system should offer flexibility in this regard, so that arrangements can be changed periodically to take advantage of opportunities and to solve problems as they emerge over the life of the lease. Thus, leases should permit regular revisions to approved management and harvesting plans.

5. **Mariculture leases should require their holders to periodically submit plans for the approval of the Department concerning the management, enhancement and harvesting of fish under them. The duration of plans, and the frequency for obtaining approvals of them, should be determined for each lease in view of its particular circumstances. The approved management plans should form part of the lease.**

CONCLUSION

It is now clearly time to establish a suitable framework of regulatory policy to accommodate new opportunities in mariculture and ocean ranching. To do this, the governments must disentangle their administrative responsibilities and provide suitable licensing arrangements. This need is acknowledged by all parties, including private operators, and so the process of resolving the functions of each government should be accelerated.

The Department has a special responsibility to ensure that appropriate licensing arrangements are available, to provide related research and technical assistance and to coordinate its activities with other federal and provincial agencies. I emphasize this because, in promoting mariculture and ocean ranching, the main goal should be economic and social development. Other federal and provincial agencies are better equipped to take the leading role in pursuing these goals. For some time at least, the development of mariculture policy will require close liaison among the many governmental agencies involved. Close consultation should be maintained as well with the mariculture advisory committee recommended in Chapter 17.

FOOTNOTES

1. D.W. Ellis, transcripts of the public hearings, Volume 64, p. 13311.
2. T.V.R. Pillay and W.A. Dill, Advances in Aquaculture. Fishing News Books Ltd., Farnham, 1976.
3. D.B. Quale and D.W. Smith, A Guide to Oyster Farming. Department of Recreation and Travel Industry, Victoria, 1976.
4. West Coast Abalone Harvesters Association, Exhibit #195, p. 2.
5. Tidal Rush Marine Farms, Exhibit #81, p. 2.
6. Current Status and Potential Impact of Commercial Salmon Ranching in the Northeast Pacific Region. B.C. Research, Division of Fisheries Technology, Industry Information Reports No. 1, Vancouver, 1980, p. 14.
7. Salmon Ranching in Chile. ICLARM Newsletter, Volume 4 No. 4, October, 1981. pp. 5-10.
8. See Carmel Finley, Poor Returns, Egg Shortages Hinder Salmon Ranching. National Fishermen. July, 1982. p. 38.
9. See The Native Brotherhood of British Columbia, Exhibit #198 The British Columbia Development Corporation, Exhibit #163 D.W. Ellis, Exhibits #20 and #188; Tidal Rush Marine Farms Ltd., Exhibit #164.
10. Exhibit #198, p. 23.
11. Exhibit #163, pp. 11-12.
12. Exhibit #164, p. 1.
13. Exhibit #163, pp. 4-5.
14. Exhibit #163, p. 5.
15. Exhibit #198, p. 30.

CHAPTER 12

INDIANS IN THE COMMERCIAL FISHERIES

> *The fishery is our heritage. In it rests our expertise and our hopes for the future.*
>
> NUU-CHAH-NULTH TRIBAL COUNCIL[1]

The Commission's terms of reference instruct me to make recommendations for ensuring that the fisheries make "the highest possible contribution to the economic and social development of the people of Canada. . . ." With respect to the commercial fisheries, the concern for social as well as economic advantage focuses attention especially on native Indians.

When the modern fishery developed in the last century, the Indians of the Pacific coast adapted to the new technology of fishing and canning much more readily and successfully than they adapted to other industries. The fisheries provided them with an opportunity to participate in the new industrial society, and for a great many, it was the only opportunity. As a result, Indians have held a particularly important place in the Pacific fisheries, and fisheries policy has been moulded, with mixed success, to accommodate their special needs.

This Commission has received a remarkable amount of information and advice from Indian organizations and individuals. Eight tribal councils and eight bands, as well as the Native Brotherhood of British Columbia, the Union of B.C. Indian Chiefs, Indian cooperatives and individual Indians have submitted briefs. Others provided information in the form of Supplementary Documents. In addition, many non-Indian participants have commented on the special problems of Indians. And the Commission has held eight of its community meetings either on reserves or in communities where Indians are dominant.

With respect to the position of Indians in the commercial fisheries, the testimony has had a consistent theme: Indian participation has been declining, and because the fisheries afford a unique economic opportunity for them, this trend must be reversed. This chapter is devoted to this problem. It reviews the history of Indian participation and the policies adopted to promote it, and recommends some initial steps toward improvement.

INDIAN PARTICIPATION IN THE COMMERCIAL FISHERIES

Before European settlement, a much larger population of Indians than survives today was settled in communities along the coast and the river systems of the interior, in locations that were determined in large part by accessibility to fish resources, especially salmon. Fish formed the foundation of their local economies and inspired many of their ceremonies and myths and much of their folklore and art.

Through all the dislocations and painful adjustments to "white" society, involvement in the fisheries has been essential for the Indians in maintaining their identity and self-respect. This theme was introduced repeatedly in presentations to this Commission. One group put it as follows:

> Participation in the fishing industry allowed us to remain living by the sea with our own people. And it was a kind of work that was more compatible with our way of life than other kinds of work in the white man's economy. It was, if nothing better, at least the lesser of two evils. It did not require us to give up our communities and our culture altogether.[2]

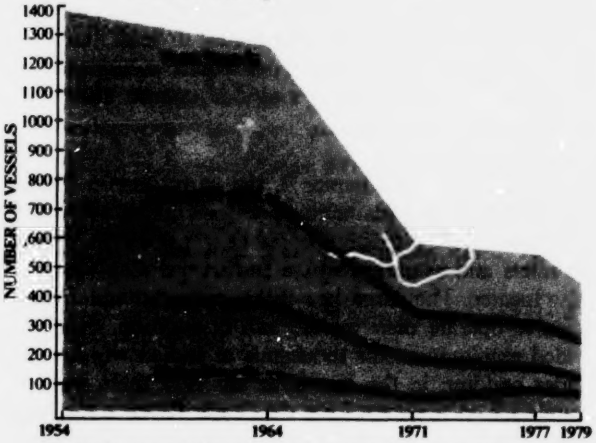
As described in Chapter 2, the early salmon fishery developed widely scattered operations along the coast. Canneries were typically located near major salmon runs in inlets and estuaries, where Indian communities were also located. They drew heavily on those communities for men to operate their vessels, and in addition, they provided employment for thousands of Indian women and older children in the canneries. By 1919 there were 97 canneries on the coast from the Fraser River to the Nass River, on Vancouver Island and on the Queen Charlottes, employing more than 9,000 people, the majority of whom were Indians. And more than one-third of all salmon fishermen were Indian.[3] They adjusted remarkably well to the fishing industry, even to the technological changes that brought a wholesale shift to powered fishing vessels and mechanized canning processes.

During the 1920s and 1930s Indian fishermen were displaced by the trend toward larger, costlier fishing vessels and packers. The consolidation of canneries also reduced opportunities for many native cannery workers. For some years the decline was slowed by Indian fishermen and their families being transported from the south to the canneries of the central coast for two months each summer. During World War II, the strong demand for fish temporarily improved Indian employment, and the expulsion of Japanese from the coast enabled many Indians to acquire fishing boats at bargain prices.[4] However, after the war Indian employment in the fisheries declined sharply.

This more recent displacement was caused by the accelerated consolidation of the canning industry into fewer, larger operations and the adoption of bigger and costlier vessels. By 1970, only 15 canneries were operating, all but 3 in the Fraser and Skeena areas. Their employees had been reduced to about 3,700, of which Indians accounted for about 1,500.[5]

Prior to this consolidation, many Indian fishermen fished in local waters close to canneries, using smaller, older vessels rented from the processing companies. Their numbers fell rapidly as the canneries closed down, especially on the central and northern coast. On the west coast of Vancouver Island, local fish camps, which Indian troll fishermen relied upon to buy their fish, also closed. Moreover, Indians were unable to raise the capital for larger, more powerful and more mobile vessels and more sophisticated gear. So they were unable to compete.

Figure 12-1 Postwar trends in Indian participation in the salmon fishery[a]



[a] Data refer to vessels licensed, but not necessarily active in any year, and are not precise.

Sources: H. Hawthorn et al., The Indians of British Columbia. 1958; M. Friedlaender, Economic Status of Native Indians in British Columbia, 1964-1973, 1975; W. McKay and K. Ouelette, Review of Indian Fishermen's Assistance Program, 1978; and Native Brotherhood of British Columbia, Exhibit #141a, Appendix VI.

In about two decades the number of vessels owned by Indians in the salmon fleet fell by roughly 60 percent, to 599 in 1971 as shown in Figure 12-1. Between 1964 and 1971 the number of gillnetters declined by about 400, to 345. Indian-owned trollers dropped from 388 to 197, and seiners, from 135 to 57. Nonsalmon vessels owned by Indians, while few in number, declined even more rapidly during this period, from 12 percent of the total fleet in 1963 to less than one percent in 1971. By the beginning of the 1970s, the fishing and processing industries employed less than half the number of Indians that had been involved two decades earlier. Since restrictive licensing was introduced for the salmon fishery 12 years ago, the number of Indian salmon licensees has declined substantially.

Table 12-1 shows the number of Indian licence holders in the salmon fishery in 1979 and in other fisheries in 1980. In 1979 Indians operated about 60 percent of the salmon vessels rented by processing companies; of the 260 licensed vessels rented by Indians, 55 were seine vessels and the remainder gillnetters.

Table 12-1 Numbers of licences for restricted fisherie
held or exercised by Indians in 1980[a]

licensed fishery	number of Indian licensees	vessels rented by Indians from companies	percent of total fleet
salmon[b]			
gillnet	252	205	20
seine	72	55	25
troll	128	—	7
total salmon	452	260	15
roe-herring			
gillnet	399		31
seine	61		30
halibut	10	1	2
spawn-on-kelp			
Indian bands	5		
individual	13		64

[a] The figures provided in this table are estimates.

[b] Estimates for 1979, including ordinary, Indian and temporary licence

Source: Department of Fisheries and Oceans.

The marked decline in Indian-operated vessels during this century does not fully reflect the decline in gainful employment, of course; employment of Indians as crewmen on fishing boats and packers, in support industries and in canneries also declined. The erosion of employment in fishing and related occupations has had a devastating impact on dozens of Indian communities that offered no other employment opportunities and where unemployment was already chronic.

> In one century, we have been dispossessed of the ability to provide for ourselves.... We have a sole economy, that of fishing, and have managed to continue participation in this resource industry as commercial fishers, but each year the ability to participate has lessened.[6]

And it created severe economic and social problems beyond those normally attributed to unemployment. For example, vessels were displaced that had been depended upon for food fishing and for transportation links with other communities.[7]

POLICIES TO PROMOTE INDIAN PARTICIPATION

The magnitude of Indian displacement and the severity of the problems it has created drove the Department of Indian and Northern Affairs and the Department of Fisheries and Oceans to adopt measures to protect and, if possible, to increase the participation of Indians in the commercial fisheries. A brief review of these experiments is instructive in designing policies for the future.

Provisions for Indians under Restrictive Licensing

Under the restrictive systems introduced in the Pacific fisheries and described in preceding chapters, a number of special arrangements were made for Indians.

Salmon licensing The salmon fleet control program introduced in 1969 initially accelerated the long-term decline in Indian participation in the fishery, a result that was feared from the start. To arrest this trend, several measures were taken:

i) In 1970, funds were provided by the Department of Indian and Northern Affairs to purchase derelict vessels from the existing fleet in order to create a "tonnage bank," which was administered under the Indian Fishermen's Assistance Program (discussed below). Indian fishermen wanting to introduce vessels into the salmon fishery were allocated the required tonnage for vessel licences out of this bank.

ii) In 1969 and 1970, whenever an Indian applied for a temporary ("B") licence rather than an ordinary ("A") licence, the Department of Indian and Northern Affairs was notified and in most cases was able to arrange for the higher ordinary licence fee to be paid.

iii) In 1971 the Indian licence ("A I") was created and any Indian could convert his ordinary licence to this new category, which carried a fee of only $10. Vessels with Indian licences were ineligible for purchase under the buy-back program, but they could be transferred to other Indians (or to non-Indians by converting the licence to an ordinary licence by paying the accumulated difference in fees between the two categories of licences). Some licensed vessels were purchased by the Department of Indian and Northern Affairs, which transferred the licences to the Indian Fishermen's Assistance Program's tonnage bank, where they were made available to Indians who required assistance.

iv) In 1972 all temporary ("B") licences held by Indians were converted to Indian ("A I") licences. Sixty-three licences were changed under this provision, but they were mostly on small boats and only 52 of them were renewed as Indian licences the following year.

v) Beginning mid 1980, holders of Indian licences were no longer permitted to convert them to ordinary licences.

Despite these special provisions, the number of Indian participants in the salmon fishery declined during the first few years of restrictive licensing. In the first two years alone the number of Indian gillnetters dropped by 29 percent. This was partly offset by an increase in Indian-owned seiners and trollers, which was apparently the result of aid provided under the Indian Fishermen's Assistance Program (discussed below). Overall, the number of Indian vessel-owners and crewmen fell by eight percent.[8]

One reason for this decline was that many Indian vesselowners failed to meet the initial landings qualifications required to obtain a salmon licence. A second was the sale of Indian vessels with ordinary licences through the buy-back program. And a third was the inability of some Indian vessels to pass the inspection for quality standards introduced in 1973. But later, for a few years after 1972, with the help of the Indian Fishermen's Assistance Program, Indians were able to maintain and even increase their relative position in the salmon fisheries.

Roe-herring licensing Two important provisions were incorporated into the roe-herring licensing system to encourage Indian participation: no restrictions were imposed on Indians until 1977, though licences for non-Indians were limited three years earlier; and Indian roe-herring licences carry an annual fee of $10, rather than the $200 for gillnet and $2,000 for seine licences issued to non-Indians.

In 1980, 61 Indian seine licences and 399 gillnet licences were outstanding in the roe-herring fishery. Existing regulations require that Indian licences not be leased to non-Indians. (While some people have suggested that this still happens quite frequently, I have not found any firm evidence to indicate that this is the case.) Nonetheless, processing companies seem to have acquired equity interests in some Indian-owned herring seine vessels.

Licensing in other fisheries For the halibut fishery, special licences are issued annually to Indians who depend on halibut for a significant part of their income but who did not qualify for the restricted halibut licences introduced in 1979. Currently, there are only 10 such licences. Also, as a general Departmental policy, individual Indians and band councils are given priority for new licences in the spawn-on-kelp fishery. At present, Indians hold 18 of the 28 licences in this fishery.

The Indian Fishermen's Assistance Program

In 1968, the Indian Fishermen's Assistance Program was introduced to improve Indian participation in the

Pacific fisheries. The program was funded by the Department of Indian and Northern Affairs and administered by the Department of Fisheries and Oceans through the Indian Fishermen's Development Board on which Indians as well as the two government departments were represented. Some $16.3 million had been expended by 1979 when the program ended, about half in grants and half in loans. Until the end of 1978 the recovery on loan payments was an impressive 91 percent; since then the rate has fallen as a result of poor returns from fishing.

The program had three primary objectives:

i) To arrest the decline in the number of Indian vessels and, if possible, to reverse it;

ii) To improve the earnings of Indian vessels so they equalled the average of the rest of the fleet; and

iii) To improve the versatility and mobility of the Indian fleet to the level of the rest of the fleet.

Secondary objectives included assisting Indians who operated rental vessels to become owners, helping young Indians to enter the fishing industry, maintaining a tonnage bank to assist Indians with licences, improving training and fishing skills, and assisting in developing shore facilities on reserve lands for fishing vessels.

Coupled with the special licensing provisions for Indians, the program achieved a good measure of success in terms of its main objectives. First, while the portion of the salmon fleet owned and rented by Indians had declined to 15 percent by 1969, by 1977 it had increased slightly to 16 percent. The increase was entirely in Indian-owned seine vessels, which increased by nearly 60 percent to 27 percent of the total seine fleet. Indian gillnetters and trollers declined at about the same rate as non-Indian vessels.

Second, the average gross earnings of Indian vessels increased from a low of 61 percent of the average for the salmon fleet as a whole in 1967 to a high of 109 percent in 1973, and averaged 84 percent during the last five years of the program. The average gross earnings of the vessels that were assisted under the program were almost half again as high as the average earnings of all Indian vessels over the program period. The value of landings by Indian vessels in species other than salmon (mostly herring) increased from less than two percent of the total catch in 1969 to more than nine percent in 1977.

Third, the versatility and mobility of Indian vessels was improved. The total tonnage of Indian vessels increased by 33 percent, more than double the rate for the fleet as a whole, and their average value increased from 67 to 87 percent of the average for the whole fleet. The vessels that were assisted by the program were valued 31 percent above the average for all vessels.[9]

Assistance was extended to 59 Indians to purchase rental vessels, and 52 operators of rental boats received aid to purchase gear and equipment. Eighty-five grants were made to bring older vessels to the minimum standards required for licensing.

The program was less successful in encouraging younger Indians to enter the fishery; many were deterred by the 12.5 percent minimum down payment (20 percent prior to 1974) required to purchase a vessel. The attempt to promote construction of shore facilities in Indian communities to increase efficiency of fishing operations also met with little success.

The main criticism of the Indian Fishermen's Assistance Program was that it benefited primarily those Indians who were already well-established and successful fishermen. It probably also increased the disparity of earnings across the Indian fleet. Furthermore, by providing financial assistance, it contributed to the problem of overcapitalization and excess capacity in the fleet, especially in the seine sector. However, in the context of the restrictive licensing program described in Chapter 9, this latter result must be regarded as almost inevitable if the competitive position of Indian fishermen were to be improved.

The Indian Fishermen's Emergency Assistance Program

In spite of the substantial assistance provided under the Indian Fishermen's Assistance Program and the special licensing arrangements for Indians, the number of Indian salmon vessels began to decline sharply after 1977. Between 1977 and 1980, the Indian-owned fleet dropped by some 100 vessels.[10] These vessels fell into two groups: better vessels (including several that had benefited under the Indian Fishermen's Assistance Program) that were sold to non-Indians in order to reap the capital gains from inflated licence values in the boom years of 1977 and 1978; and submarginal vessels that survived the prosperous years but failed in the poor years that followed.

Indians and the Department of Indian and Northern Affairs were afraid that the conspicuously poor year of 1980 and the bleak prospects for 1981 would accelerate the displacement of Indians. As a result, a stop-gap emergency program (the Indian Fishermen's Emergency Assistance Program) was implemented late in 1980. Its purpose was to assist with debt payments, repairs, equipment and start-up costs of Indians threatened with bankruptcy.[11] This program was funded by the Department of Indian and Northern Affairs and administered by two Indian-controlled boards: one controlled by the Native Brotherhood of British Columbia; the other, by the 13 bands of the Nuu-chah-nulth Tribal Council. It provided for $2 million in grants, another $2 million in loan guarantees and $200 thousand in direct loans. At the time of the Program's termination early in 1982 the $2 million in grants had been fully expended, as had the $200 thousand in direct loans; and $700 thousand in loan guarantees had been extended.

This program had two significant deficiencies. First, very little assistance could be provided in the form of loan guarantees. Apparently because of the depressed condition of the industry, banks have been reluctant to extend even guaranteed loans to fishermen. Second, no assistance could be provided to make payments on loans from the Indian Fishermen's Assistance Program because of a rule that federal funds cannot be used to write off debts to the federal government. This is important, because these loans are the largest form of debt for many Indian vesselowners.

Nevertheless, emergency funds for vessel repairs, start-up costs and essential equipment enabled many Indian fishermen to fish in the 1981 season who otherwise probably could not have operated. And because that was a fair season for salmon, these fishermen have been able to improve their financial position.

Acquisition of a Gillnet Fleet

In 1982 B.C. Packers Ltd. sold 243 vessels and 252 licences (most of its northern gillnet rental fleet) to the Northern Native Fishing Corporation, an organization established by three tribal councils. The purchase was arranged through the cooperation of the Departments of Indian and Northern Affairs and Fisheries and Oceans, and involved a federal grant of $11.7 million, of which $3 million was provided for vessel improvements and operating costs, the remainder for payment to the vendors. The corporation intends to retain title to the licences, and to lease the licences and sell the boats to Indian fishermen, most of whom have hitherto operated the vessels under company rental arrangements.

The Salmonid Enhancement Program

The ambitious Salmonid Enhancement Program is described in some detail in Chapter 5. I include some discussion of it here because one of its official objectives is to improve native well-being, which implies improving incomes and employment for Indian fishermen and cannery workers.

Several criticisms have been made about this program regarding Indian involvement. Most important is its geographical orientation: projects are concentrated in the south coast, especially in the Johnstone Strait area, where Indian fishermen and communities are already relatively prosperous.[12] Another is its focus on large hatchery projects; Indian groups argue that a greater emphasis on small stream improvement projects would yield greater benefits to Indians and their communities.

Partly in response to such criticisms, a formal Community Development Program was initiated under the Salmonid Enhancement Program in 1978, mainly for the benefit of Indian communities. Its present budget provides $3.6 million annually for 15 community development projects, of which 12 are with Indian communities. Tentative proposals are aimed at expanding the program to 62 projects at an additional cost of $45 million during the next five years.

Community development projects are contracted to Indian bands and other groups who assume responsibility for specific works, such as small hatcheries, stream rehabilitation and resource surveys. The Department provides technical advice to the contractor and a training program for those involved in the project. Problems of one kind or another have arisen in most projects, but the program has been generally successful (see Chapter 5). The response from Indians has been enthusiastic; about 150 Indian communities have applied to undertake projects. This interest is the main reason for expanding the program.[13]

The Indians' main criticism of the program is that the Department gives the contracting bands insufficient control over the projects, a criticism that must be weighed in light of the experimental and risky nature of much enhancement work. Other concerns are that funds are insufficient or not disbursed promptly and that Indians have inadequate influence over the general design of the program.

Indian Mariculture

The Department of Indian and Northern Affairs, in cooperation with the Marine Resources Branch of the Ministry of Environment for British Columbia and the Department of Regional Economic Expansion, is currently attempting to develop a program for native Indian involvement in mariculture. This program recognizes the keen interest of coastal Indian bands in mariculture, the strategic location of Indian reserves for mariculture, and the provincial government's interest in encouraging Indian participation in this activity.[14]

Recently the Department of Indian and Northern Affairs established an Indian Mariculture Task Force, with membership composed of representatives from various tribal councils. The goal of the task force is to develop a mariculture program for Indians. The task force operates autonomously, with Departmental personnel acting primarily as coordinators.

This careful approach, involving Indians in the earliest stages of program design, is undoubtedly appropriate in view of the uncertainties of commercial success. But, as I explain in Chapter 11, the potential for mariculture is substantial, so the program deserves continuing support.

The measures I propose in Chapter 18, by clarifying the respective roles of the federal and provincial governments, will help advance the program.

Observations on Experience

The historical record leads to certain general conclusions relevant to determining appropriate future policies.

First, apart from brief intervals, and despite efforts to prevent it, large numbers of Indians have been displaced from the commercial fishing industry in recent decades.

Second, as numerous studies and submissions to this Commission have confirmed, this displacement has generated serious economic and social distress in Indian communities, many of which offer no alternative employment. The relative immobility of Indian people has left them heavily dependent on unemployment insurance and welfare payments. This is costly to the taxpaying public and, at the same time, inflicts high costs on the Indians themselves in the form of idleness, dependency, demoralization and social and personal breakdowns.

Third, Indians can obviously adapt and perform well in the commercial fisheries. Because of their greater familiarity with fish and the activities associated with fishing, coastal Indians have stronger motivation, greater skill and more experience to support their participation in commercial fishing than they do in most other fields. In contrast, development programs based on commerce, tourism and related activities, which are largely alien to Indian cultures and traditions, have usually been unsuccessful. In short, the commercial fisheries afford a highly promising means of involving coastal Indians in constructive economic activity. Moreover, it is an activity in which many of them claim an historic right to participate. The fisheries, then, must be regarded as an obvious base for policies aimed at Indian social and economic development.

Past experience also shows that, in the rapidly changing environment of the commercial fishing industry, expecting developmental programs to be entirely self-supporting is unrealistic. They will likely need external support and subsidization for a considerable time. Decades of dependency and exclusion from economic opportunities have left widespread apathy, coupled with passive and sometimes active resistance to public authority. Indian culture and traditional means of livelihood have been overwhelmed by a complex "white" society with its rapidly changing technology, and by the organizational structures imposed upon them. Their self-development has been retarded by a governmental approach to Indian administration that, until recently, tended to be authoritarian and paternalistic.

Indians have also experienced difficulty in obtaining the same financial assistance available to their non-Indian competitors:

> (Indians) do not have access to the capital resources required for investment in large new vessels or expensive equipment. Generally low incomes plus the fact that reserve land cannot be secured as collateral has limited most Indians' ability to borrow money from traditional financial institutions.[15]

Policies for increasing Indian participation in the fisheries must recognize these special problems.

POLICY PROPOSALS

For many coastal Indian communities, the basic policy choice is now fairly clear. It is between increasing subsidies to coastal Indian communities in the form of welfare funds and personnel needed to cope with the growing problems of unemployment, dependency and demoralization, on the one hand, and subsidizing fisheries programs that will provide productive employment and contribute to individual and community morale, on the other. I have no doubt that the latter is the most constructive not only from the point of view of the Indians themselves but from that of Canadians generally. The position the Indians take concurs with this judgement:

> It makes more sense to enhance the ability of Indian people to support themselves through the fishing industry than it does to spend increasing amounts of federal revenue supporting them on social assistance.[16]

Sensitive and costly programs will be required to successfully increase the involvement of Indians in the commercial fisheries and thereby to increase their self-reliance in the long term. Many of the benefits sought are difficult to measure in economic terms because they involve unquantifiable social, psychological and cultural improvement. But this does not mean that they are less important than more quantifiable economic benefits.

In approaching recommendations for improving Indian participation in the commercial fisheries, several general problems brought to this Commission's attention must be addressed. One is the role of the Department of Fisheries and Oceans. As I suggested in Chapter 1, the Department is obliged to modify and adapt its policies and procedures to accommodate social policy objectives relating to the fisheries, and to provide the technical expertise to help ensure that the objectives will be met; but it is not the appropriate agency to undertake either the designing or the funding of needed social programs. In the past the Department has, in the opinion of some, become too deeply and directly involved in efforts to solve Indian problems; it has therefore been seen as the agency responsible for these problems and has consequently become a target of criticism. Thus, many Indian groups that have appeared before this Commission have expressed frustration and even hostility over the Department's apparent insensitivity to their problems.

The Department of Indian and Northern Affairs, with its direct responsiblity for Indian affairs, is best placed to initiate and financially support programs of social and economic development for Indians. The Department of Fisheries and Oceans must adapt its policies to accommodate these programs without obstructing the objectives of Indian administration or of the Indians themselves. Of course, the technical administrative advice of the Department of Fisheries and Oceans should be sought in designing any such projects involving the fisheries.

For the reasons presented above, the government must initiate a well-defined program to protect and expand Indian participation in the commercial fisheries, using the considerable experience of past programs of assistance. It should have long-term goals, and hence be more than an emergency aid program, though its ultimate objective should be to eliminate the need for its continuance. Accordingly, it should not only assist Indian vessel-owners to improve their productivity and young Indians to enter the fishery for the first time, but also provide training to enable them to succeed.

In the present circumstances of the Pacific fisheries, any program designed to encourage Indian participants must be compatible with the general need to rationalize and reduce the overexpanded fleets. This presents an obvious difficulty, and it calls for careful program design. First, it requires that any additional fishing licences made available to Indians be drawn from the existing stock, rather than being added to it. Second, it requires that provisions be made to ensure that Indian licences will remain in Indian hands, rather than be transferred to non-Indians. Third, it requires that provisions be made to ensure that Indians will have access to credit and financial support that will enable them to operate and improve their position. Finally, it should provide for a high degree of Indian participation in the program's administration.

Indian Fishermen's Economic Development Program

These conditions are largely met by the Indian Fishermen's Economic Development Program proposed by the Native Brotherhood of British Columbia. Following extensive consultation within the Indian fishing community, the program has been the subject of intensive planning during the last three years by a working committee consisting of representatives of the Native Brotherhood and the Departments of Indian and Northern Affairs, Fisheries and Oceans, and Employment and Immigration.

The essential objectives of the program are to provide financial assistance to young Indians to enable them to acquire vessels and enter the industry, to provide training in fishing skills and business management, to secure a permanent block of fishing licences for Indian fishermen, and to assist Indian owners of marginal vessels to improve them.

The proposed program was presented in a submission to this Commission.[17] Having examined it and alternatives, I make the following recommendation:

1. **The federal government should proceed toward implementing the Indian Fishermen's Economic Development Program as quickly as possible.**

I support this program's general outline, but since negotiations are already taking place, I refrain from making recommendations on matters of detail.

Its proposed structure is designed to alleviate some of the problems encountered by the earlier Indian Fishermen's Assistance Program. The program would be managed by the Indian Fishermen's Development Corporation, which would be a nonprofit organization controlled by Indians. Directors would be elected from regional groups of Indians traditionally involved in commercial fishing to ensure representativeness and equitable treatment. The Corporation is expected to be affiliated in some way with the already-established Northern Native Fishing Corporation.

The current proposal calls for a budget of about $20 million over five years to meet the costs of purchasing licensed vessels, upgrading existing vessels, training and administration. It is proposed that this be funded by a governmental grant, provided through a special allocation from the budget of the Department of Indian and Northern Affairs, the Western Initiatives Fund, other sources, or a combination of these.

An issue that is not addressed in the present proposal concerns the possible continuing need for operating subsidies for Indian fishermen. Many Indian fishing operations are marginal, and the objectives of the program imply that they may require financial assistance. Moreover, past experience suggests that the success of such programs often rests on some support beyond the initial assistance. So I recommend the following:

2. **The Department of Indian and Northern Affairs should provide staff and resources for the purpose of monitoring the financial performance of Indian fishing operations under the Indian Fishermen's Economic Development Program.**

To stabilize the Indian presence in the fisheries, the corporation would purchase licensed vessels from non-Indians, sell or otherwise dispose of the vessels, and make the licences available to qualified Indian applicants, who would purchase or construct their own vessels suitable for licences under the prevailing vessel replacement rules. Depending upon their financial circumstances, recipients might be provided with additional assistance from the corporation.

The interest of the corporation in acquiring licences should, incidentally, strengthen the value of Indian ("A I") licences, which are presently restricted to Indians.

Discussions with the Department suggest that it would be desirable to create a new category of Indian licences for this purpose that would unambiguously prohibit their transfer to non-Indians and would enable this and the Northern Native Fishing Corporation to maintain ownership of licences while leasing them to individual Indians. I therefore make the following recommendation:

3. **Licences held by Indian fishing corporations should not be transferable to non-Indians and licensing policies should be developed to enable such licences to be leased to individual Indians.**

These conditions would ensure that the licences would never leave the Indian community, and would advance the developmental objectives of the corporation.

The proposed Indian Fisherman's Development Corporation would be well-suited to organizing some of the innovations in commercial fishing that I have suggested in earlier chapters. For example, it could organize small numbers of licensees to operate in "pocket fisheries," establish new contractual arrangements with foreign fish buyers, and organize fishing cooperatives. More specifically, the corporation could establish an interest in the long-term opportunities in mariculture and ocean ranching. In the shorter term, the proposed corporation's interest in economic activity based on fish converges with one of the objectives of the Salmonid Enhancement Program, which is to expand the Community Development Program component of the Salmonid Enhancement Program.

Finally, my proposals in preceding chapters for fleet rationalization and reform of the licensing system call for special provisions to ensure that Indians will be able to maintain and improve their position, the third condition for a successful Indian fisheries policy noted above. I therefore recommend—

4. **The Department of Indian and Northern Affairs should provide Indians and Indian corporations with the financial assistance they need to compete successfully in the proposed periodic reissuing of licences by competition.**

In summary, the proposed program appears to be a well-conceived and constructive approach to the problem of Indian participation in the commercial fisheries, and offers considerable promise for improving the economic opportunities of coastal Indian communities. It is a costly program, but the alternative of not undertaking it is likely to be even more costly, not only in economic terms, but also in terms of social distress among Indian people. Moreover, if it succeeds, the cost will decline as Indian fishermen become more self-reliant. And if the other proposals made in this report are also adopted and prove successful, this improvement in the position of Indian fishermen will be accelerated.

FOOTNOTES

1. Nuu-chah-nulth Tribal Council, Exhibit #15, p. 8.
2. Nuu-chah-nulth Tribal Council, Exhibit #15, p. 6.
3. W.F. Sinclair, The Importance of the Commercial Fishing Industry to Selected Remote Coastal Communities of British Columbia. Department of Environment, Vancouver, 1971.
4. H. Hawthorn, C. Belshaw and S. Jamieson, The Indians of British Columbia. University of Toronto Press, Toronto, 1958. p. 113.
5. W.F. Sinclair, The Importance of the Commercial Fishing Industry. p. 16; W. McKay, The Native Commercial Fisheries and the Potential Impact of Oil Spills. Environment Canada, Ottawa, 1978. p. 19.
6. Kwakiutl District Council, Exhibit #89, section 4, p. 6.
7. See Exhibits #89 and #15.
8. B. Campbell, An Assessment and Evaluation of the Salmon Vessel Licence Control Program 1968-73. Fisheries and Marine Service, Department of the Environment, Vancouver, 1974. Table 24 and pp. 46-58.
9. W. McKay and K. Ouellette, Review of Indian Fishermen's Assistance Program, 1968-69-1977-78. Department of Indian and Northern Affairs, Vancouver, 1978. p. 13.
10. Department of Fisheries and Oceans, Exhibit #167, Table 2, p. 18.
11. W. McKay, The Indian Fishermen's Emergency Assistance Program. Commission on Pacific Fisheries Policy, Research Document R-2, Vancouver, August 1981.
12. C. Cummins, M. Friedlaender and D. Williams, Impact of the Salmonid Enhancement Program on Native People. Fisheries and Marine Service, Environment Canada, Vancouver, 1978. p. 34; see also Kwakiutl District Council, Exhibit #89.
13. Department of Fisheries and Oceans, Exhibit #167, p. 21.
14. A recent policy statement of the government of British Columbia states an intention to "consult with Indian people with respect to resource management and development plans that affect their traditional uses of and special interests in marine resources." Commercial Fisheries and Mariculture: A Policy for the 1980s. Ministry of Environment, Victoria, (undated).
15. Nishga Tribal Council, Exhibit #129, p. 18.
16. Nuu-chah-nulth Tribal Council, Exhibit #15, p. 18.
17. The Native Brotherhood of British Columbia, Exhibit #141a, pp. 69-74.

CHAPTER 13

OTHER INDUSTRIAL DEVELOPMENT POLICIES

> *...we are pinning our faith in... a stable, secure future in a prosperous industry.*
>
> UNITED FISHERMEN AND ALLIED WORKERS UNION[1]

The preceding six chapters have dealt with governmental policies for licensing access to fish resources and regulating commercial fishing fleets. In this chapter I consider other areas of governmental intervention that influence development of the fishing industry. These include additional controls on commercial fishing, aid for vessel construction, regulation of the processing industry and controls on marketing.

OTHER COMMERCIAL FISHING LICENSING ARRANGEMENTS

The main instruments for regulating the commercial fishery are the licences that provide access to the resources. But in addition to these, dealt with in earlier chapters, the Department has evolved other types of licences that warrant review. The most important are the personal licences required of all commercial fishermen and the licences issued to vessels that transport fish.

Personal Commercial Fishing Licences

A long-standing element of the regulatory system for commercial fisheries is the licence required of all persons who fish on commercial fishing vessels. The regulations under the Fisheries Act specify that to qualify for one of these licences a person must be a Canadian citizen or, if not a citizen, one who has served in the Canadian armed forces or has been a permanent resident in Canada for less than three years. The number of licences issued is unrestricted.

In my Preliminary Report I reviewed the rationale for these licences and suggested that a strong case could be made for abolishing them, but I postponed making a firm recommendation until this report. Since then, the commentary I have received on this question has strengthened my conclusion that the licences serve no justifiable function.

First, these licences were introduced many decades ago under quite different circumstances from those that prevail today. Apparently, they were originally intended to exclude certain ethnic groups, who were denied citizenship, from the fisheries. Today, the original policy objective no longer exists. Regulations for governing the employment of noncitizens are provided under the Immigration Act, so special rules for the fishing industry are redundant.

Second, the licences are no longer needed as an enforcement tool. Today, with all fishing regulated under specific privileges in the form of licences and permits, the full onus of responsibility for any infractions should be on the holders of these fishing privileges, not on the individuals employed by them. This, of course, is the practice in other industries that use Crown resources.

Third, these licences are not appropriate means of raising revenue from the fisheries. The fee for these licences was recently doubled from $5 to $10 on the grounds that the former fee (which yielded a total revenue of roughly $95 thousand) was insufficient to cover the cost of administering them. Today the cost is undoubtedly greater. The revenue could be raised at much lower cost as an increment to other fees and charges proposed in this report, and the manpower and financial resources now expended in administering these licences could be directed to much more useful purposes.

Finally, testimony at my hearings and meetings has revealed that the personal commercial fishing licence is the source of much inconvenience, especially to fishermen in communities where there is no resident issuing officer. Fishermen must often travel considerable distances to an office of the Department and then, if an officer is not readily available or if the fisherman is unable to produce sufficient evidence of citizenship, they are inconvenienced further. Moreover, cases recur of fishermen being unable to produce their licences on demand because they have misplaced them or deliberately refrained from carrying them in wet fishing conditions. This has led to charges, or more often, to friction with the authorities.

In short, these licences can no longer be justified and should be abolished as an anachronism of fisheries policy. I therefore recommend —

1. **Personal commercial fishing licences should be abolished.**

I understand that some of these licences were issued last year for five-year terms. Holders of these should be rebated their unused portion.

Regulating Fish-Packing Vessels

Packers are vessels that transport fish from the fishing grounds and fish camps to processing plants. Packer boats and barges have a traditional place in the salmon industry, and are used in the roe-herring fishery as well.

At present any vessel that is licensed for fishing may be used as a packer, with no additional licence required. Other vessels may be issued special packer ("D") licences, which authorize them to pack if they meet requirements regarding their construction and fish processing capability. These licences are issued annually for a fee of $10, and their number is unrestricted. In 1980-81, 192 packer licences were issued.

Over the years, the dependence on packers has diminished for several reasons.[2] One is the increase in size and seaworthiness of fishing vessels, which enables them to deliver their own fish. A second is the progressive shortening of weekly fishing times (resulting from expanding fleets) enabling fishermen to deliver fish between openings. A third is the decreasing proportion of the fleets controlled by the processing companies, so that more fishermen seek out and deliver their fish wherever they can obtain the highest price. A fourth reason is that developments in other forms of fish transport have reduced the need for packers; transportation by truck or even aircraft is sometimes faster or more economical.

These trends have created concerns about the future place of packers and tendermen. But it would not be in the broad public interest for the Department to intervene directly to obstruct this gradual evolution of the industry. It should confine its activity to maintaining standards of vessels that handle catches to protect the quality of fish at sea, as it now does through packer licences. I therefore propose only a change in the licence fee to bring it into line with my other licensing recommendations.

2. **The Department should continue to issue licences to fish packers not otherwise licensed to carry fish, providing they meet established quality control standards. The fee for packer licences should be raised to $50.**

The fleet rationalization I propose in earlier chapters could have the result of reducing, if not reversing, the recent decline in demand for packing services.

SUBSIDIES FOR VESSEL CONSTRUCTION

An obvious reform needed to provide consistency between other government programs and fisheries policy is the removal of subsidies that encourage construction and rebuilding of fishing vessels. It is incongruous for the government to provide financial incentives to build new fishing vessels when the overriding problem is one of too much fishing power, particularly when almost the entire fishing industry disapproves of the subsidies, as is the case on the Pacific coast at least. In 1980, the government was advised (not for the first time) to eliminate "perverse subsidies" to those who construct new fishing vessels.[3] The overwhelming weight of opinion expressed at my public hearings was consistent with that position, and my Preliminary Report last year contained strong recommendations for immediate removal of direct and indirect subsidies for vessel construction. Since then, the Minister has announced his support for these recommendations, but beyond this no action has been taken.[4]

The general policy position of the Department is that no subsidies will be paid to support construction of vessels to be used in the Pacific fisheries. This is an improvement over previous policies, under which vessels were subsidized heavily; however, it is contradicted by policies of other federal government departments.

The most important of these direct and indirect subsidies are the following:

i) The Department of Industry, Trade and Commerce provides a subsidy to Canadian shipyards of 9 percent of the approved cost of constructing or converting vessels greater than 75 feet in length. These shipyard subsidies are normally passed on to those who contract for new vessels.

   I have been informed by the Department of Industry, Trade and Commerce that during the last 3 fiscal years (which were depressed years for fishing vessel construction) subsidies were provided for constructing 32 vessels intended for fishing on the west coast, and they amounted to $5.7 million.[5]

ii) The Income Tax Act permits investors to deduct a varying fraction of the cost of new investments from their tax otherwise payable in the year of acquisition. A tax credit of 10 percent is provided for designated equipment on new fishing vessels.[6] This is a deduction from tax payable, not from taxable income, and so is much more valuable to a taxpayer than a standard deduction of the same amount.

iii) Ordinarily, the Income Tax Act allows fishing vessels to be depreciated at a rate of 15 percent, but new vessels built in Canada can be depreciated at an accelerated rate of 33⅓ percent. This rate can be claimed on a "straight line" basis, and the result is to shelter from tax an amount of income equal to the full cost of a new vessel in as little as three years, whereas it would ordinarily take seven years.

   These arrangements provide an incentive for fishermen, especially those in high income brackets, to invest in new vessels in order to shelter incomes from tax.

iv) The Department of Fisheries and Oceans, under the Fisheries Improvement Loans Act, guarantees Fisheries Improvement Loans of up to $150 thousand from banks to fishermen for the purchase, construction or improvement of vessels. The subsidy element in these loans is mainly in the favorable interest rate of one percent above the prime rate.

In the fiscal year 1980-81, 415 loans were extended under this program to vesselowners on the Pacific coast, of which 238, amounting to $11.8 million, were for the purchase or construction of vessels. At the end of March of this year, some $68 million in guaranteed loans was outstanding, of which about 80 percent were held by vesselowners on the Pacific coast.[7]

The Department can be called on to honour the guarantees if fishermen default on their loans. In recent years claims have ranged from $200 to $400 thousand annually, and recoveries on the claims paid have been low. The number of loans in default has apparently increased sharply in recent months because of high interest rates and other economic conditions. Calls on the Department's guarantees can be expected to rise in consequence.

v) The Federal Business Development Bank has a program of loans to provide fishermen with working capital and with capital for purchasing boats and equipment. In July of this year, 116 loans were outstanding to the west coast fishing industry, amounting to $4 million, of which $450 thousand was authorized during the last fiscal year.[8] To the extent that borrowers are given credit they might not otherwise obtain or that the interest rates charged are lower than they would otherwise have to pay, this loan program encourages investment in the fishery.

vi) The Small Business Development Bond program, extended last November to include unincorporated businesses, provides assistance to businesses in financial difficulty. Under this program, the banks can convert from $10 to $500 thousand of fishermen's debt into Small Business Development Bonds, for which the interest charged is only 2 to 4 percent above half the bank prime rate. Interest paid by bondholders is not deductible from income for tax purposes. About 500 fishermen on the Pacific coast are currently included in this program, holding bonds amounting to about $70 million.[9] Because eligibility for these bonds is limited to those who are in serious financial difficulty, they do not encourage new entrants into the fishing industry, but they sustain some who could not otherwise continue.

In addition to these programs, there are special assistance programs for Indians (described in Chapter 12) and a wide variety of other federal and provincial support programs directed toward manpower training, processing, technology development and insurance. Since many of these have a well-defined and defensible social purpose, they are beyond the scope of my concern here, which focuses on programs that stimulate general expansion of the already overexpanded fishing fleets.

It is not possible to quantify the impact of all these subsidies; some are part of national programs that do not isolate fishing vessels on the Pacific coast, and the effect of many is indirect. But the direction of their impact is clear. They encourage vessel construction and expansion of fishing capacity, thereby aggravating the complicated problems of controlling fleets. They are a wasteful use of taxpayers' money that is urgently needed to deal with other fisheries management problems described in this report. They should therefore be abolished without further delay.

3. **General subsidies in the form of tax credits, accelerated depreciation allowances, subsidies to shipbuilders and loan guarantees should be immediately terminated insofar as they apply to fishing vessels used on the Pacific coast.**

In Chapter 9 I recommended that no more commercial fishing licences should be issued for newly constructed vessels for the time being; this will forestall some of the impact of these subsidies. But many of them apply to vessel improvements as well, and some of them support acquisitions of secondhand vessels. Now, while few new vessels are being built, is the appropriate time to abolish subsidy arrangements that threaten to frustrate future gains from fleet rationalization and improved economic conditions.

UNEMPLOYMENT INSURANCE

Although fishermen are not employees in the usual sense, and are not normally paid a wage, they are nevertheless covered by the unemployment insurance system. This is a result of a special amendment to the Unemployment Insurance Act in 1956,

> . . .providing for the extension of the act to persons engaged in fishing notwithstanding that they are not employees of other persons, and for including as an employer of a fisherman any person with whom the fisherman enters into contractual or other commercial relationship. . . .[10]

Thus, for purposes of unemployment insurance, a fisherman is considered an employee of whomever buys his fish, and the buyer must pay the employer's share of the contribution to the unemployment insurance fund.

The unemployment insurance provisions for fishermen are complicated and controversial, and were the subject of much criticism at this Commission's hearings. But the insurance scheme is a national one and raises fundamental issues of social policy that go well beyond the scope of this inquiry. It would be inappropriate for me to propose changes in its application to commercial fishermen in the Pacific region in isolation. So, I confine my commentary to problems that have been brought to my attention without making specific proposals for altering the program.

First, some fish buyers complain about the complications and cost of administering contributions. Because the amounts due in respect of each fisherman varies and a fisherman often deals with more than one buyer, the administrative load is heavy.

Second, it is frequently pointed out that because the fishing season is short for most fishermen, their benefits far exceed their contributions. In the most recent period covered by seasonal benefits, Pacific coast fishermen received $13.3 million; and fishermen's contributions amount to less than 5 percent of the benefits received.[11] The resulting drain on the unemployment insurance fund is sometimes seen as a subsidy to the fishing industry, encouraging participation in an overcrowded activity.

Third, benefits are paid without regard to the fisherman's total earnings. Some earn high incomes from fishing and others receive earnings from other occupations. So the benefits are not consistently paid to those in need in the usual sense.

Fourth, the criteria for eligibility for seasonal benefits puts pressure on the Department to alter fishing periods in order to enable fishermen to obtain the required number of stamps. In order to qualify for benefits between November 1st and May 15th (the most relevant period for fishermen), a fisherman must have had a minimum of 10 to 14 weeks of insurable employment during a specified preceding period. As a result, fishermen press the Department to provide fishing opportunities in the required number of weeks, leading to what are commonly referred to as stamp fisheries.

This last is the feature of the unemployment insurance system that bears most directly on fisheries policy. As I explained in Chapter 4, the Department has a heavy responsibility to design fishing plans and to regulate fishing during the season, to meet the needs of resource management and conservation. It should not be distracted from this duty by provisions in the unemployment insurance program.

These are complicated problems, and should be reviewed in the full context of the unemployment insurance system in Canada. I therefore recommend —

4. **The Unemployment Insurance Commission should review the unemployment insurance provisions for fishermen, taking full account of the circumstances of the commercial fisheries of the Pacific coast and their management requirements.**

A related matter raised by some participants at the Commission's hearings is the desirability of catch insurance for fishermen.[12] Such arrangements are well developed in some other countries, and the Department has supported catch insurance arrangements for some fisheries on the Atlantic coast. Advisors to the Minister suggested in 1973 that such arrangements be considered for the Pacific salmon fishery, but so far, this has not been done.[13] Yet the major Pacific fisheries, which generate such volatile earnings, seem particularly well suited for catch insurance for fishermen. Thus I recommend —

5. **The Department, in consultation with the Pacific Fisheries Council, should investigate the desirability and feasibility of catch insurance for fishermen engaged in Pacific fisheries.**

THE PROCESSING INDUSTRY AND ITS REGULATION

Pacific coast fish are processed into a variety of products and marketed widely. The processing industry, consisting primarily of canning, freezing and curing operations, is linked to primary fishing activities through fish markets and vessel ownership. In the following paragraphs I describe the basic features of the industry and how it is regulated.

Dimensions of the Processing Industry

Fish buyers and processors are licensed by the Province of British Columbia under its Fisheries Act,[14] and the numbers licensed in both categories in 1980 are shown in Table 13-1. The number of processing companies active in the industry is smaller than the number of licences issued because some firms operate more than one plant and a separate licence is required for each. In 1980 there were 77 processing firms, 41 of which processed fresh salmon, 42 frozen salmon and 13 canned salmon, while 17 firms processed roe herring (but even the firms in each of these categories are not mutually exclusive).[15]

Table 13-1 Fish buyers' and processors' licences issued in 1980

	number of licences issued[a]
salmon cannery	18
fish cold storage	92
fish processor	179
fish buyer	672
other	175
total	1,136

[a] Figures refer to licences issued in the fiscal year ending March 31.

Source: Marine Resources Branch, Ministry of Enviroment of British Columbia.

The numbers of licences for all categories except canneries have increased during the last few years. Fish buyers have increased particularly rapidly, reflecting in part an influx during the late 1970s of so-called cash buyers (often associated with foreign interests), who purchase and pay for fish on the fishing grounds. They are not usually involved in canning and therefore often compete only for the best-quality fish for freezing. However, most fish are purchased by long-established processing companies or their agents. Between 1973 and 1977 these processors, who are involved in canning as well as fresh and frozen sales, accounted for 95 percent of the purchases of raw salmon.[16]

Processing roughly doubles the landed value of fish catches. In 1980, the wholesale value of processed products produced exceeded $400 million, as shown in Table 13-2. Some $290 million, more than 70 percent of the total, was accounted for by salmon products. This includes some fish imported from the United States for processing in Canada. Roe-herring production accounted for 10 percent of the total, but production in 1980 was only about half the level of preceding years because of a lengthy strike.

Table 13-2 Value of fish products produced on the Pacific coast

	wholesale value in 1980 ($ millions)	wholesale value in 1980 (% of total)
salmon		
canned	146.8	
fresh	10.4	
frozen	109.3	
roe	13.2	
other	9.3	
total	289.1	71
roe-herring[a]		
roe	33.1	
spawn-on-kelp	2.4	
frozen for roe	1.1	
total	36.6	9
food and bait herring		
frozen for food	7.2	
bait	1.6	
herring by-products	2.8	
total	11.6	3
halibut[b]	11.7	3
other groundfish	34.9	9
shellfish and invertebrates	14.9	4
other species	5.1	1
TOTAL, all products	$403.9	100

[a] Value of roe-herring production in 1980 was low because of a strike. The average in the preceding eight years was $70 million.

[b] Includes halibut landed by Canadian fishermen in U.S. ports.

Source: Compiled from Fisheries Statistics of British Columbia 1980. Economics and Statistical Services, Fisheries Management, Department of Fisheries and Oceans, Vancouver, 1981.

In recent years the number of enterprises serving the fresh market has increased considerably; and the volume of salmon processed into fresh or frozen products has increased, while the volume canned has declined somewhat. The number of roe-herring processors has undergone a dramatic rise and fall, from 21 in 1975, to 42 in 1979, down to 17 in 1980.

Recent fluctuations in numbers of salmon and roe-herring processors and buyers have been triggered mainly by changing market circumstances in Japan. The majority of those that entered and exited were small firms, and they had little effect on the general pattern of control in the processing industry.

Industrial concentration Processors range from small specialized firms to the large integrated operations that produce most fish products. A small number account for most of the production, however. (A recent study indicated that the three largest firms (excluding cooperatives) accounted for more than half of all salmon purchased.[17]) But a significant portion of the catch never enters the market: in the salmon and herring fisheries, the landings recorded by vessels owned by processing companies, by members of fishermen's cooperatives and by others who have made advance commitments to buyers are not subject to arms-length transactions.

The industry originally consisted of a large number of canneries scattered along the coast near major fishing grounds, but it is now consolidated into a few large processing facilities near the major population centres, with only a few plants in remote coastal locations.[18] As this geographical realignment took place, ownership of the industry became concentrated in the hands of a few large integrated operations.

The degree of corporate concentration in the processing industry is indicated in Table 13-3, which shows the salmon and herring roe production accounted for by the largest producers. The industry is most concentrated in the canned salmon sector, where the 4 largest firms account for 82 percent of the total output. Concentration is much lower in fresh salmon processing, and has been decreasing as this sector has grown in recent years. The 4 largest firms processed less than 40 percent of output in 1980, down from 57 percent 5 years earlier. Concentration in herring roe production appears almost as high as in canned salmon, but the figures shown for 1980 exaggerate this because a strike that year interrupted supplies to many firms.

Table 13-3 Share of production of salmon and herring products accounted for by the largest firms in 1980

	salmon				herring roe
	fresh	frozen	canned	all products	
	(percent of all production)				
two largest firms	23	54	68	49	70
four largest firms	39	63	82	62	84

Source: Unpublished data from the Department of Fisheries and Oceans.

In 1980 the largest processor, British Columbia Packers Limited, increased its share of salmon processing capacity from about 33 percent to about 42 percent through acquiring assets from the Canadian Fishing Company Ltd.[19] These included vessels, vessel servicing facilities and processing capacity. In addition, in the last few years a number of bankruptcies and mergers involving smaller firms have occurred. These latter developments, and not internal growth of the largest companies, account for most of the increased concentration of the processing industry.

The salmon canning industry is clearly highly concentrated. However, there is no clear evidence that the existing structure is an impediment to industrial efficiency, and in view of Canada's limp competition policy I cannot advocate restrictive controls on the fishing industry in isolation. The current degree of concentration in the canning sector would be cause for greater concern were it buttressed by artificial barriers to new entrants through licensing or control over resource supply. But, as I describe below, the dominant canning companies' control over fish supplies is relatively modest and decreasing, and provincial licensing of processors does not restrict entrants.

Vertical integration Since the beginning of the fishery on this coast, processing companies have maintained their own fleets, renting or chartering vessels to fishermen, many of whom are Indians. In Chapter 9 I described arrangements between the Minister and the Fisheries Association of B.C., whose members agreed not to increase their share of the salmon fleet at the inception of the limited-entry licensing program in 1969. Since then, the consistent trend has been for processors to dispose of their interests in fleets, and this trend may well continue.

> We want to leave primary fishing entirely and concentrate on the processing side. Entrepreneurial captains owning their own boats can do a better job of getting fish out of the water and controlling their costs than we can.[20]

In general the processing industry appears to be depending more on market competition for fish and less on the traditional means of securing fish from their own or tied fleets. This is a desirable trend, which should enhance the vigour and competitiveness of the industry.

Moreover, I have made recommendations in Chapter 8 calling for limits on licence holdings to forestall any reversal of these trends that might lead to undue concentration of fishing privileges. Those restrictions will ensure that processing companies now holding substantial fishing privileges do not increase their shares, but they will accommodate new companies, cooperatives or other ventures as long as the proposed limits are adhered to. In order to maintain a vigorous and competitive industrial structure, the Department should monitor licence holdings carefully to ensure that those limits are not exceeded.

Fish Prices and Markets

To complete this description of the Pacific processing industry, the following paragraphs briefly review fish pricing and product markets.

Determination of fish prices The prices paid in the two major fisheries, salmon and roe-herring, are heavily influenced by pre-season negotiations between representatives of fishermen and processors. Fishermen are represented mainly by the United Fishermen and Allied Workers Union and the Native Brotherhood of British Columbia, and processors, by the Fisheries Association of British Columbia. Minimum prices are negotiated for salmon caught with net gear, though in recent years the prices paid have often risen above these minima as a result of strong market demand and the influence of cash buyers. The prices paid for salmon landed with troll gear are not negotiated, and they are generally higher than prices for net-caught fish, depending on species and quality.

The landed prices paid for salmon do not represent the full payment for the catch because of significant post-season bonuses paid to vesselowners. These payments serve to strengthen ties between fishermen and particular buyers; and, because bonuses are not necessarily subject to division between the vesselowner and the crew, they tend to bolster the return to vesselowners. (The traditional share system for seine vessels provides 7/11ths of the earnings to the crew, with the remainder going to the captain and owner of the vessel.) Bonus payments have been paid to gillnetters as well as seiners, and recently to some trollers.

Because the roe-herring industry is relatively new and has been turbulent, it is difficult to speak of a normal process of price determination. And in the late 1970s, eager cash buyers drove roe-herring prices well above the levels contemplated when the pre-season price agreements were concluded. The United Fishermen and Allied Workers Union and the Native Brotherhood negotiate an amount to be paid to crews (not the full landed price).

In other fisheries, prices are determined more flexibly in response to market supply and demand. Most halibut are sold through long-established exchanges in Prince Rupert and Vancouver, in which buyers post bids and sellers negotiate sales, often before the fish are landed. The prices of other species also fluctuate with market conditions between and during the fishing seasons.

In addition to landed prices and bonuses, some processors provide fishermen with services at less than cost.

These include packing and collecting services, boat and gear storage, repair facilities, credit and capital financing, and commitments to purchase all fish delivered. This practice is particularly important in the salmon fishery, but it appears to have been declining in recent years as fishermen have become more independent and prices have become increasingly influential in determining the distribution of fish.

Product markets Fish processors on the Pacific coast have little influence over the prices they receive for their products. They produce only 13 percent of the world's catch of Pacific salmon, of which roughly 70 percent is exported, some 44 percent to Japan in the form of frozen salmon. But this accounts for only 11 percent of Japanese frozen salmon imports and a considerably smaller share of the total Japanese consumption. The market share of Canadian producers in other export markets such as Britian and Europe is also low. Thus —

> Canada's (B.C.) position in supply and market is by no means dominant - it must react to resource and economic realities related to the harvests in other countries.[21]

Sales in the domestic market are very sensitive to retail prices. Salmon and most of the other fish produced on the Pacific coast are luxury foods, which are not a major component in the diet of most Canadians; so price increases will induce them to shift to meat, poultry and other substitutes.

All this implies that producers have little market power. Moreover, they are highly vulnerable to external economic circumstances such as supplies from elsewhere, changing exchange rates and world economic conditions.

Products other than salmon have narrower markets. Herring roe is sold almost exclusively in Japan, where a volatile market has created highly unstable conditions in the Canadian roe-herring industry. In this market as well, Canadian suppliers have little influence on price.

Groundfish, other than halibut, are of much lower value and hence are not sold in distant markets. Some 60 to 70 percent of the groundfish produced on the Pacific coast is sold in Canada, the rest almost entirely exported to adjacent markets in the United States. The minor products serve a variety of specialized markets. Geoducks are sold almost entirely in Japan, as are most abalone; mussels are sold mainly in Europe, while shrimps, prawns, crab and other shellfish are sold mostly in Canada.

Some participants at the Commission's hearings expressed anxiety about possible intervention by the government in marketing fish products, apparently resulting from governmental controls on the Atlantic coast. I see no useful purpose to be served by direct governmental involvement in marketing fish on this coast, and in view of the concern about this matter I specifically recommend —

6. **The government should not become directly involved in marketing fish products produced on the Pacific coast.**

Regulation of Fish Buying and Processing

Under the Canadian constitution, the federal government has authority to license fish buying or processing only at sea. For this purpose the Department issues processor "P" licences; but so far only one has been issued.

Shore-based fish buyers and processors are licensed by the Province of British Columbia under its own Fisheries Act. Licences are issued annually and fees are based on the nature and size of the facility. A separate licence is required for each facility operated.

The province places no limit on the number of buyers and processors licensed:

> An "open" licensing system will provide for a climate in which competition for raw product can flourish, in which new entrants to the industry can reduce corporate concentration and generally provide for economic efficiencies which will allow the industry to respond to changing market demands.[22]

However, some participants in this Commission's public hearings pressed for restrictions on buyers and processors. Some have argued that the influx of additional buyers in the late 1970s, especially of cash buyers, has disrupted fish markets by driving up landed prices, and one participant urged the government to —

> . . . investigate the advantages of tying commercial buyers' licenses to processors as this would prevent the growth of a new "middleman" level of fish traders which provide no benefit to the fishing industry.[23]

That is, only processors would be eligible to buy fish. It has also been suggested that an unrestricted entry policy for the processing sector leads to excess capacity.

In Chapter 7 I explained the need for government policy to regulate entry to common-property fisheries in order to prevent their economic benefits from being dissipated through wasteful fleet expansion. But there is no corresponding need to limit entry to the fish buying and processing industry because there is no common property problem: these operators deal with fish after they have been landed and so have become the property of fishermen. In this respect, these sectors are no different from any other manufacturing industry, so government does not need to treat them differently. Competition among firms in the industry, and the opportunity for others to enter if they feel that they can successfully compete, promotes economic efficiency in the use of available resources.

Furthermore, independent fish buyers can perform valuable services to the industry by matching available raw products with the requirements of processors and thus ensure that raw product will flow to those able to use it most efficiently and hence who will pay the highest price. This kind of competitive environment also ensures maximum prices to the fishermen.

The same holds true for fish processing. Some excess capacity is bound to occur in certain sectors at particular times, as new firms enter or as one sector expands (such as freezing) at the expense of another (such as canning) in response to market trends. Parallel circumstances can be expected in any manufacturing industry.

Consequently, I endorse the province's policy of unrestricted entry for both fish buyers and processors. But while new entrants should not be artificially restricted, I see no need either for subsidizing them. The industry appears capable of adjusting to and accommodating the available supplies of fish; and artificial stimulus to expand capacity will only prejudice the competitive position of established firms.

A related concern of some established processors is that the smaller operators "high-grade" the harvest; that is, they buy and process only the most profitable species and grades of fish:

> The existence of these "high-graders" is predictably forcing traditional processors to re-evaluate their role as a market for all fish from all fishermen. . . . Standards cannot be so onerous that they effectively restrict all new entries, but they should certainly be at a minimum level requiring a serious investment in processing facilities and a year-round commitment to be a complete market for a distinguishable class of fishermen.[24]

Public policy should not discourage specialized processors, however. If each processor were required to provide a market for all fish from all fishermen, potential efficiencies of specialization in the industry would be lost. Processors should be free to participate in any sector of the industry and to specialize in any product. This competition helps to ensure that resources are used most efficiently and will generate maximum net returns.

However, the pricing arrangements for fish aggravate the difficulty the large producers face in competing with the so-called independents. The negotiated prices for more valuable species are apparently sometimes lower than their value, to offset higher prices for low-valued species. And, as I explained above, pre-season bargained prices for net-caught salmon do not discriminate among grades, and the large buyers (who are traditionally committed to their best fishermen to never refuse any fish) sometimes take poor-quality fish at a loss. This suggests a need for more discriminatory price negotiations and a grading system for landed fish, as I propose below.

PRODUCT QUALITY REGULATION

Primary responsibility for maintaining standards of quality of fish products rests with the Inspection Division of the Department's Field Services Branch. Its role is to ensure that fish products meet health standards and requirements relating to grading and labelling, and to promote improvements to industry practices.[25]

The Department's legal authority for much of this work derives from the Fish Inspection Act,[26] which provides for inspection of fish products that are traded interprovincially and internationally. But it administers other related federal legislation as well.[27] As I explain in Chapter 18, the province is responsible for standards of products produced and marketed entirely within British Columbia; but its relevant legislation, the British Columbia Fish Inspection Act,[28] is also administered by the federal authorities.

To ensure that fish products meet health standards, the Department's Inspection Division routinely tests samples for bacteria and contaminants. A special coordinator is concerned with controlling paralytic shellfish poison. All imported fish products are subjected to rigorous inspection as well.

The division also periodically inspects vessels licensed to fish and pack fish and facilities for unloading, handling and transporting fish to ensure they meet specified standards.

Processing and packing plants in British Columbia are licensed by the province, but since most export some of their production, they require federal certification. The Department enforces both federal and provincial regulations relating to their construction, equipment and operations.

The Department's fish quality improvement program includes efforts to improve fish handling practices on vessels, to upgrade the quality of fish frozen at sea, to improve quality control in processing plants and to design new regulations. In cooperation with the industry, the Inspection Division is attempting to develop grade standards for final products. And, to facilitate international trade through establishing processing and product standards, the division is participating in the Codex Alimentarius Commission of the United Nations.

In 1981-82 the Inspection Division was allocated 64 person years (not all of which were filled) and a budget of $1.8 million.

Product Inspection and Quality Control

The Department and the fishing industry recognize the extreme sensitivity of fish markets to the product's reputation for high health standards. The industry is particularly vulnerable to deficiencies in the quality of canned salmon products. Thus, the Department's role in ensuring that standards of quality and health are consistently met is important to the whole fishing industry. Moreover, many countries require that imported fish products be certified by a recognized authority as having met specified processing and quality standards. The Department meets this requirement by certifying exports (which, incidentally, enables exporters and importers to proceed with financing arrangements).

The Department's performance in protecting product quality appears to have been very good, and its product inspection and certification arrangements are widely respected. In 1981 export certificates were issued for fresh and frozen fish products valued at more than $100 million and canned salmon valued at $40 million. The Department's certification of quality undoubtedly helps to ensure this continuing access to valuable foreign markets.

My investigations suggest that the commercial fishing industry would benefit from the Department's efforts in maintaining quality standards being extended in a couple of respects. The most important relates to the grading of fish landed, especially salmon. At present, salmon are roughly graded in some cases by size and colour. A significant distinction is made between troll-caught and net-caught fish, but this distinction is becoming obsolete with changes in technology and fish handling: fish caught in nets and handled carefully are now often sold as troll fish (which bring a higher price). As a result, the statistics on landings by sectors of the fleet are misleading, and grade distinctions are inconsistent.

The problem is complicated by the present pricing arrangements for net-caught salmon, in which pre-season bargained prices provide for a uniform price for each salmon species. This provides no reward for fishermen and vesselowners who strive for higher quality standards.

In other primary food-producing industries, such as wheat and livestock, governments play a valuable role in supporting quality grading that serves as a basis for pricing. A similar system for grading raw fish, in which variations in fish quality are recognized, would provide incentives for achieving higher standards. This would benefit the fishing industry and also serve the broader public interest by encouraging the most beneficial use of resources. Accordingly, I recommend —

7. **The Department, in close consultation with the fishing industry, should explore the feasibility of establishing quality grades for fish landed, with special attention to salmon.**

I emphasize the importance of close cooperation with the industry in this matter. I do not intend that the government become heavily involved in dockside grading or interfere with private marketing processes; it should promote the establishment of grades and leave the industry itself to administer them to the maximum extent possible.

The second opportunity for constructively extending product grading relates specifically to the small food herring industry. In Chapter 10 I noted the sensitivity of foreign markets to the grade of food herring products, yet there are no international standards for them. Although markets for food-herring products are currently weak and while herring bring much higher returns in the roe fishery, this may change in the future especially if foreign buyers can be assured of high-quality food herring from this region.

I therefore recommend —

8. **The Department should investigate the possibility of establishing product quality standards for food-herring products.**

This investigation should be directed toward establishing standards recognized in international trade, which in this case involves mainly sales to Japan. Thus, it should be conducted in consultation either with the Codex Alimentarius Commission or directly with Japan.

Export Regulation

My major reservation about the Department's approach to quality control in exported fish products is its attempt to use its regulations to restrict export opportunities in the interest of promoting local processing: it apparently restricts exports of frozen sockeye and pink salmon to protect the canning industry; it applies processing requirements on roe and food herring and herring spawn-on-kelp in an effort to increase "labour content"; and it imposes parallel regulations on pollock and certain shellfish.[29]

These objectives are quite separate from the Department's responsibilities in setting and enforcing product quality standards, and indeed conflict with the objective of enhancing export opportunities. Although pressure from established processors and plant workers to restrict exports of less highly processed products is understandable, to do so is inconsistent with fishermen's interest in high prices and with the public interest in generating the highest returns from resources.

The Department takes satisfaction from the fact that Japanese buyers pay more for the frozen salmon it allows to be exported than they pay for the corresponding U.S. product.[30] I fear this may be the result of preventing foreigners from buying anything but the best quality products. But exporting only the best product should not become a policy objective. The purpose should be to assure buyers of the quality of the products they bargain for, but not to prevent them from buying the full range of products produced.

Moreover, the argument that such restrictions provide more employment is apparently exaggerated; studies have shown that the labour content in frozen salmon exports is very close to that of canned salmon. Furthermore, restrictions on fresh and frozen exports reduce the value added in processing in Canada; and the benefits to producers of canned fish are outweighed by the losses they impose on fishermen and other producers.[31]

I therefore urge the Inspection Division to use quality controls to promote market opportunities for fish products, and to avoid using them to manipulate patterns of processing and trade.

9. **The Department should continue to develop its program of quality certification for exported fish products to ensure that product standards are met; it should refrain from using quality controls as a means of restricting export trade.**

Thus, the fishing industry should be free to respond flexibly to changing market opportunities for fish products.

A related matter is the Department's practice of restricting fishing licences in certain fisheries in an attempt to generate higher prices by controlling the supply of the product available to foreign markets.

> . . .there have been examples of the Department of Fisheries and Oceans developing internally, market misinformation for use in fisheries management. For example, in the mid-1970's the Department determined that the Japanese herring roe market would be damaged if Canada produced in excess of 45,000 tons of roe herring. After industry protestations, the limits were raised to purely biologically safe catches of in excess of 80,000 tons. During that period, herring roe was sold at its highest prices experienced to that date.[32]

This objective also lies behind the limitation on herring spawn-on-kelp licences, described in Chapter 10. Although the resources can support a greatly expanded industry, the Department has refused to issue more licences for fear of depressing prices in the Japanese market.

The Department's commercial licensing policy ought not to be concerned with manipulating market power. As I have emphasized in preceding chapters, it should be directed toward providing access to the available resources in a way that will encourage the fishing industry to respond efficiently to market opportunities. (This implies avoiding development of more fishing capacity than needed to harvest the available catch, but this is a separate matter from restricting the available catch itself.)

I therefore recommend —

10. **The Department should not be influenced by considerations relating to market prices in deciding the appropriate number of commercial fishing licences to be issued.**

Such considerations distort licensing policy and are beyond the responsibility of the Department.

Vessel Inspection

Apart from distributing information about fish handling methods, the Department's vessel-inspection program is confined to ensuring that vessels handling fish are constructed to meet certain specified standards for fish holds and other facilities that enable them to maintain the quality of catches. But even the best-equipped vessel can prejudice fish quality unless it is maintained in a clean condition. Thus, participants in the Commission's hearings have noted that the failure to enforce standards of housekeeping on fishing vessels is a major weakness of the vessel-inspection program. This deficiency should be met by gradually extending the program to include inspections of operational maintenance to meet standards of health and quality on vessels. Thus I recommend —

11. **The Department should extend its vessel-inspection program to include inspections of operational cleanliness and standards of vessel housekeeping.**

However, having made this recommendation I should note that regulations applied to vessels are only indirect means of improving fish quality. Ideally, attention should be focused on the quality of fish landed. Vessel standards should be used only as an expedient means of forcing the industry to equip itself adequately to handle fish. In the long run, more sophisticated quality grading of landings should replace dependence on regulating the characteristics of vessels.

CONCLUSION

This chapter has dealt with a variety of arrangements that are tangential to the Department's central role in managing fish resources and fishing activity. Some of these, like maintaining product quality standards, are essential. Some others are, or should be, the responsibility of other governmental agencies, such as the regulation of buyers and processors by the province and regulation of exports by the federal trade authorities. The Department should resist the temptation to become involved in regulating activities in which it does not have unique expertise or responsibility.

FOOTNOTES

1. United Fishermen and Allied Workers Union, Exhibit #138, p. c-1.
2. United Fishermen and Allied Workers Union, Local 23, Exhibit #192.
3. F.J. Doucet and P.H. Pearse, Fisheries Policy for the Pacific Coast: Issues and Advice. Department of Fisheries and Oceans, Vancouver, 1980, p. 26.
4. Press Release. Minister of Fisheries and Oceans, Vancouver, March 2, 1982.
5. The figures for each of the years are as follows:

fiscal year	number of vessels built with subsidy	total subsidy ($ thousands) paid
1979-80	14	$2,216
1980-81	7	1,566
1981-82	11	1,875

   These figures exclude vessels constructed for export. These data were provided by the Department of Industry, Trade and Commerce.
6. The deduction is 10 percent of the first $150 thousand, and 5 percent of the balance.
7. Fisheries Improvement Loans Act, Annual Reports. Department of Fisheries and Oceans, Ottawa, 1981.
8. Figures provided by the Federal Business Development Bank.
9. D. Reid, "The Small Business Development Bond Program." Prepared for the Department of Fisheries and Oceans, Vancouver, 1982.
10. Debates, House of Commons, Session 1956. Volume III, p. 6843.
11. Information supplied by the Departments of Employment and Immigration, and Fisheries and Oceans.
12. Native Brotherhood of British Columbia, Exhibit #198.
13. West Coast Salmon Fleet Development Committee Report. Fisheries and Marine Service, Department of the Environment, Vancouver, April 1973.
14. Fisheries Act, Revised Statutes of British Columbia, 1979, Chapter 137.
15. Records of the Marine Resources Branch, Ministry of Environment of British Columbia.
16. Marvin Shaffer and Associates, "An Economic Study of the Structure of the British Columbia Salmon Industry." Prepared for the Salmonid Enhancement Program, 1979.
17. Shaffer and Associates, "Structure of the British Columbia Salmon Industry." p. 34.
18. See, for example, D.J. Reid, "The Development of the Fraser River Canning Industry 1885 to 1913." Fisheries and Marine Service, Department of the Environment, 1973; Shaffer and Associates. "Structure of the British Columbia Salmon Industry."
19. For the current level of participation in the industry by British Columbia Packers Limited, see Exhibit #98, p. 18.
20. A spokesman for George Weston Limited (parent company of British Columbia Packers Limited), quoted in Financial Times of Canada, May 17, 1982, p. 17.
21. Exhibit #98, p. 16.
22. Commercial Fisheries and Mariculture: A Policy for the 1980's. Province of British Columbia, Ministry of Environment, April, 1980. p. 11.
23. Fisheries Association of British Columbia, Exhibit #63, p. 40.
24. Exhibit #63, p. 39-40.
25. Department of Fisheries and Oceans, Exhibit #184, p. 9.
26. Revised Statutes of Canada 1970, Chapter F-12.
27. Including portions of the Fisheries Act, Food and Drug Act, Consumer Packaging and Labelling Act, Saltfish Act and the Freshwater Fish Marketing Act.
28. Fish Inspection Act, Revised Statutes of British Columbia, 1979, Chapter 136.
29. Exhibit #184, pp. 19-20.
30. D. Wilson, Department of Fisheries and Oceans, transcripts of the public hearings. Volume 62, p. 12976.
31. See R. Morley, "A Benefit Cost Analysis of Export Reduction for Frozen Sockeye in British Columbia." Prepared for the Department of Fisheries and Oceans, 1979; Shaffer and Associates, "Structure of the British Columbia Salmon Industry"; and Marvin Shaffer and Associates, "Economic Management of the Processing Sector." Prepared for the Ministry of Environment, Victoria, 1979.
32. Exhibit #63, p. 10.

Part IV

Indian and Sport Fisheries

CHAPTER 14

THE INDIAN FISHERY

The fishery has been of such importance that it is at the very roots of our cultures; our lives have revolved around the yearly arrival of the river's bounty. And so we cannot talk of the fishery without talking of our cultures because in many ways they are one in the same.

GITKSAN-CARRIER TRIBAL COUNCIL[1]

The Indian fishery puts relatively light demands on the fish resources in the Pacific region but it involves issues of profound social, political and economic consequence. It is a complicated and often contentious aspect of fisheries policy. This is reflected in the remarkable amount of testimony this Commission has received on the question of Indian fishing, from Indian bands, tribal councils and individuals, and also from commercial fishermen, sport fishermen and others. Present policies are obviously unsatisfactory in many respects, and most groups stress the urgent need for reform.

The Indian fishery has presented a major challenge for this Commission. The legal underpinnings of Indian fishing rights are subtle and complicated. Neither these nor the traditions upon which they are based are widely understood. Few non-Indians have been exposed, as I have, to the extensive testimony of Indian leaders about their traditional fishing, their economic and cultural dependence upon fish and the problems they have encountered in exercising what they regard as their historical rights to fish. Moreover, because the rich cultural heritage unique to the Indians of this region is not widely appreciated, the task of formulating appropriate policies to accommodate it in relation to other users of the resource is even more difficult.

Furthermore, the Commission's terms of reference restrict me to consider only Indian rights to fish and their implications for resource management. Yet Indian fishing rights are a part of the much larger and more controversial issues of aboriginal rights and land claims, which have yet to be resolved.

A number of stimulating presentations by Indian organizations at the Commission's public hearings have helped to identify means of alleviating the present deficiencies of Indian fisheries policy and for deepening Indians' involvement in resource management. Certainly some fundamental changes are called for. I perceive promising opportunities for Indians and for improvements in management through a bold new approach to this question.

To bring these issues and opportunities into focus, in this chapter I sketch the historical background of traditional Indian fisheries and examine the available information about the dimensions of this fishery and its impact on the resource. Then I trace the development of regulatory policy and identify the most pressing policy issues. The legal character of the Indian fishery and associated issues were raised repeatedly in the public hearings, so I will review these as well before turning to policy objectives and recommendations.

INDIAN FISHERIES AND POLICY DEVELOPMENT

The present Indian fishery, or the Indian food fishery as it is commonly called, is a continuation of traditional native fishing practices.[2] The traditional importance of fish extended well beyond its food value, however. Fish were also a major commodity of trade among Indian bands and tribal groups. The pattern of Indian settlement can be traced in large part to the accessibility of fish both on the coast, where permanent villages and seasonal camps were located near fishing grounds, and in the interior, where villages and fishing stations were established on rivers and streams near places where salmon could be easily caught. Today, this pattern of Indian settlement remains in large part unchanged. Seasonal fishing established the annual routine of life, and the runs and catches of salmon were viewed with reverence since fish were the primary means of survival. The great social and cultural significance of fish, especially salmon, is reflected in the important role they play in elaborate traditions of feasts, ceremonies, myths and art.

Indian people devised a wide variety of methods for harvesting fish, adapting their technology to the varying species sought and their physical circumstances. Hooks were fashioned from bone or hardwood and attached to lines made of cedar bark or nettle fibre. Spears, harpoons, dipnets and gillnets were common. Weirs and traps were especially effective in catching salmon migrating upstream to their spawning grounds.

Salmon were usually abundant, but in low-cycle years they were sometimes insufficient for winter food supplies. At such times coastal tribes could turn to groundfish and shellfish to meet their needs, but interior tribes occasionally suffered hunger and starvation. And even in years of abundance, tribal wars sometimes prevented harvests of available stocks

The fur trade, with its associated forts and trading posts, changed the complexion of the Indian fishery. In addition to furs, Indians were encouraged to barter foodstuffs, including fish, for manufactured goods. Dried salmon rapidly became a staple food among fur traders because of its light weight, preservation qualities and rich food value.

Trends in Indian Fishing

The native Indian population in British Columbia and their harvests of fish, mainly salmon, have undergone long cycles of growth, decline and revived growth since the early 19th century. According to Hudson's Bay Company records, the Indian population in 1835 was estimated to be 70 thousand. But since initial European contact decades earlier, they had suffered from the introduction of new diseases, firearms and alcohol, so the precontact population of the region could have been as high as 125 thousand.[3]

The Indian population in the province declined dramatically during the next 100 years reaching a low point of about 23 thousand in 1929. Since then, their numbers have gradually increased to some 57 thousand registered in 194 bands by latest count. More than 21 thousand are registered in 96 bands on the Fraser River and its tributaries. On the next 2 largest salmon-producing rivers, the Skeena and Nass, there are 4,000 Indians in 8 bands.

The importance of fish in the traditional Indian society of this region can hardly be exaggerated. According to some estimates, fish comprised three-quarters of the diet of coastal Indians and a large but unknown portion of the diet of interior Indians.[4] One estimate suggests that before colonial settlement 700 pounds of fish per capita were consumed each year;[5] this implies a very substantial total catch.

Today, many Indians still depend heavily on fish for food, although their diets are now much more varied. Some continue to fish with traditional equipment, the technical and economic efficiency of which often compares favourably with that of the modern industrial fishery. Traditional methods of processing and preserving fish through dry-curing, smoking and other means are also practised and, with the recent renewed interest in traditional culture, its use in feasts and ceremonies has been increasing. The traditional Indian fishery is thus a blend of a search for food, production for trade, a social activity and a cultural expression. The distinction customarily drawn by non-Indians between commercial and recreational fishing is inappropriate in this context. Indian fishing has elements of both, and more.

The Indians' historical attachment to fish and the importance of fish to their cultural identity often surprises non-Indians. As one group put it in testimony to this Commission—

> . . . fish are more than food, fish are an integral part of life itself. Without fish we have no culture and with no culture we are not a people. To us, the marine resources of B.C. are part of our struggle to survive and to grow.[6]

Current Catches

The available statistical data on both the amount of fishing activity and on catches in the Indian fishery are very weak. In 1978, the last year for which figures have been compiled, about 3,500 individual permits and 50 band permits were issued. In addition, some permits were issued to Indian commercial vesselowners to allow them to catch specified quantities of fish for coastal bands that could not otherwise meet their requirements using traditional methods in the rivers.

But there are many more people involved in the Indian fishery than these numbers suggest. Individual permits are issued to heads of families, but they allow other members of the family to fish. And band permits enable band councils to assign fishing rights to any member of their bands. Recent estimates suggest that about 25 thousand Indians in British Columbia benefit directly from the food produced in the Indian fishery; this represents almost half the number of status Indians in the province.[7]

A variety of methods are used to collect data on the catch. Local fishery officers, who are responsible for reporting this information, have developed their own methods for estimating catches in their administrative areas. Sometimes the whole catch is counted. More often, only a sample of the catch in a few nets is counted and then extrapolated. In some cases estimates are based on interviews after the season, and in others the local fishery officer is provided with reports from the band council or individual fishermen. As a result of these diverse methods, the accuracy of catch estimates is questionable in many cases, and many believe that catches are underestimated.

Salmon are overwhelmingly important, but a wide variety of other species are used in the Indian fishery as well. Many bands attach a special value to eulachon (ooligan or candlefish), which is used as a source of oil ("grease") and protein, and for traditional medicinal and cultural purposes. Some coastal bands take significant quantities of herring and herring roe; some catch groundfish such as halibut and cod; others use clams, oysters, abalone and other shellfish extensively; and some interior Indians take considerable catches of kokanee (land-locked salmon).

The catch of salmon in the Indian fishery has apparently been increasing significantly in recent years.[8] The estimated catch in 1965 was 350 thousand fish, or roughly 1.6 percent of all salmon landings. By 1975 this had increased to roughly 600 thousand fish, and by 1980 to 700 thousand fish or 3.5 percent of salmon landings. Increases in catches have been the most pronounced in Johnstone Strait, where they have more than trebled, and off the west coast of Vancouver Island, where they have doubled. In both of these areas, Indians have been able to use commercial gear to supplement their traditional methods. In the Fraser River system and Howe Sound area, average catches have increased over this period by only about 60 percent.

Table 14-1 Indian Salmon Catch by Area[a]

	Fraser River and Howe Sound	West Coast Vancouver Island	South Coast	Northern B.C. and Yukon	Total
		— thousands of fish —			
1965	200	13	22	119	354
1970	207	12	31	153	403
1975	347	15	44	182	588
1980	263	39	143	251	696

[a] Includes steelhead catch, which accounts for less than one percent.

Source: Department of Fisheries and Oceans, Exhibit #167.

Sockeye is by far the most important species taken, accounting for 50 to 70 percent of the total, but all the other salmon species are used as well. No statistical information on the catch of fish other than salmon is available because no method of reporting has been established.

Most salmon are taken in freshwater on the Fraser, Skeena and Nass river systems, but Indian fishing takes place throughout the province. Table 14-1 sets out Indian catches by area. The Fraser River is by far the most important source, and accounts for as much as 60 percent of all the salmon taken in the Indian fishery. Many Indian reserves are located close to the river or its tributaries, and its large summer runs of salmon provide an important part of the Indians' food supply. Fishing is especially intense upstream from Lillooet, where traditional culture and practices are pronounced.[9]

Although the dependence of these Indians on salmon for food has declined to some degree over the years, the fishery remains both a valuable source of protein and an important element in their cultural life.[10] In the upper Fraser River, where Indians depend on specific, individual stocks, yearly fluctuations in runs and strict conservation measures for ensuring adequate escapement often lead to shortfalls in catches. In the lower reaches of the Fraser River, Indians have access to more plentiful supplies of fish; but even there, increased restrictions on fishing times in recent years have made it difficult for some to obtain their supplies.[11]

The Skeena and Nass Rivers account for about 30 percent of the salmon catch in the Indian fishery (and a much larger proportion of the eulachon catch). Fish are extremely important to the Indians on these rivers; more than a third participate directly in fishing and a much higher proportion depend on it for food.[12] Fish are a particularly important component of the diet of Indians in the Nass Valley.[13] In recent years, heavy commercial exploitation has restricted supplies of certain species for the Indian fisheries on these rivers.[14]

Coastal Indians depend on a wider variety of fish, but some have experienced increasing difficulties in obtaining their customary catches of salmon. Many coastal bands have come to depend on commercial gear, and much of their food fish is taken in the commercial fishing season. But the widespread displacement of Indians from the commercial fishery in recent years (see Chapter 12) has left some bands without the means to meet their requirements even by this method. The Department has partially alleviated this problem for certain bands in the Strait of Georgia by allowing commercial fishermen to harvest surplus hatchery stocks for distribution. This arrangement does not, of course, replace the traditional and social significance attached to Indian fishing.

Even with the increases in catch in recent years, the present Indian catch of about 5 million pounds annually is only a fraction of the level prior to European settlement.

Evolution of Regulatory Policy

The present arrangements governing the Indian fishery are the outcome of a century of policy development. Throughout, the basic issue has been that of reconciling the conflict between Indian traditions of fishing and hereditary fishing areas, on the one hand, and early British colonial policy, federal-provincial constitutional responsibilities over Indians and fisheries, and the need to conserve fish stocks, on the other. In the evolution of policy, a significant role was played by several royal commissions, and the travels and hearings of some of these bear a striking resemblance to those of this Commission.

When British Columbia entered Confederation in 1871, certain constitutional responsibilities having an important bearing on Indian fisheries policy were assumed by the Dominion Parliament. The Dominion's jurisdiction included "sea coast and inland fisheries" and also "Indians, and lands reserved for the Indians." From the beginning, measures adopted regarding the Indian fishery under both of these areas of responsibility recognized a special status for the Indian fisheries.

Fisheries regulation Before 1877, all fisheries in British Columbia were essentially unregulated.

> In this era there was no distinction between "food fishery" and commercial fishing. There were no regulations, no Proclamations, no Orders-in-Council, no laws of any kind which specifically restricted or regulated Indian fishing in British Columbia.[15]

The Dominion Fisheries Act, which was applied to the province that year, included the first official recognition of native fisheries in the province by enabling the Minister to issue licences to Indians to allow them to catch fish for their own use. The British Columbia Fishing Regulations were first adopted under the Act the next year, but it was not until 10 years later in 1888 that they dealt specifically with the Indian fishery. A lease or licence was required by others for fishing in all waters of the province, but it was provided that —

> Indians shall, at all times, have liberty to fish for the purpose of providing food for themselves, but not for sale, barter or traffic, by any means other than with drift nets, or spearing.[16]

Over the ensuing decades the regulations continued to give special recognition to Indian fisheries, with a few minor modifications and exceptions. In 1894 the permission of the Department was required for Indians to engage in the fishery, a requirement that was strengthened by regulations enacted in 1910. Then, a permit was required, under which the Department could fix the area and time that fishing activities could be undertaken and the gear to be used.

These provisions continued more or less unchanged until 1977, when new regulations required licences instead of permits. Although this change in name caused some anxiety among Indians, it was not really very substantial. As with the former permits, licences could specify the area, gear and time of fishing. (In this report I continue to refer to these authorizations as permits, as they are commonly known.) The regulations continue to prohibit the sale or trade of fish to others. The most recent development came in 1981, when a new regulation required permits to specify both the species and the quantities of fish that may be taken. However, I understand that this latter requirement has been implemented only in some permits.

The permit system has given rise to a good deal of friction between the Department and certain Indian bands, as I describe below. In 1977, in an effort to reduce tension, the Department initiated the practice of issuing permits to some Indian bands instead of to their individual members, with the permits to be administered by band councils. This practice has been formally acknowledged in recent amendments to the fisheries regulations. Today, about 10 percent of the bands engaged in the fishery participate under this arrangement, and the Department reports few problems with enforcing these permits. For other bands, individual permits continue to be issued directly by fishery officers, though sometimes they simply supply a number of permits to an Indian community. Another arrangement involves issuing permits to Indian commercial fishermen authorizing them to use commercial gear to catch food fish for distribution to others.

Indian lands administration A recurrent source of friction between the two levels of government and the Indian community since British Columbia joined Confederation has been the allotment of reserves to Indian bands in the province. The Terms of Union that were settled between the two governments in 1871 provided that —

> . . . tracts of land of such extent as it has been hitherto the practice of the British Columbia Government to appropriate for that purpose, shall from time to time be conveyed by the Local Government to the Dominion Government in trust for the use and benefit of the Indians. . . .[17]

Difficulties with interpreting these general expressions led to the appointment of Reserve Allotment Commissions over the 40 years from 1876 to 1916, which were to make recommendations to both governments with respect to reserve lands for Indian bands in the province. In the course of discharging their responsibilities, these commissions frequently recognized traditional Indian fishing locations by allotting to some bands exclusive fishing rights at tidewater and over certain stretches of inland streams, although at the time the commissioners expressed concern about their authority to do so.

CURRENT PROBLEMS

The present policy governing the Indian fishery is not only unsatisfactory to many Indians, but gives rise to awkward management and enforcement problems for the Department. Unless the arrangements are improved, friction between the government and the Indian community will almost certainly increase.

Increasingly stringent regulations, particularly those requiring permits and curtailing fishing times, have been regarded by the Indian community as unfair interferences with their historical traditions and rights. Some have complied with the regulations, but others have refused, leaving fisheries officials with little choice but to prosecute. Tighter regulations have meant increased enforcement, which in turn has led to charges and court battles. Already sensitive relations between Indians and the Department have become inflamed, and resentment and mistrust have been aggravated.

> We also have been legislated against, arrested or threatened with arrest for practicing our harvest of resources.... Since regulations, restrictions and policies have come into existence by the Federal Government, harassment has become a real problem for Indian people. Harassment on Indian Fishing increases as more policies are developed.[18]

> ... a great deal of harm and bad faith has arisen ... over the rights ... to food fish....[19]

This deterioration in relations between Indians and the government is the result of a long history of resentment over restrictions on Indian fishing, recurrent legal disputes and confrontations, and recently the resistence by the Department to band fishing by-laws (described below). And pervading all this is the frustration over the slow progress toward resolving the fundamental issues of Indian land claims and aboriginal rights.

Several concurrent trends can be expected to aggravate present problems. Increasing pressures on resources from the commercial and sport fisheries in addition to the growing demands of the Indian fishery itself will inevitably call for improved control of escapements and more stringent regulation of fishing, as I explain elsewhere in this report. Moreover, the sharp rise in Indian fishing may well continue in view of the trends in Indian populations and age structures, and the movement of off-reserve Indians back to their communities.

It should be emphasized that Indian fishing is not problematical everywhere. In some areas, smooth working relationships have developed between the Department and local bands. But in many other areas, the issue of Indian fishing is contentious and in some, explosive. In the following paragraphs I summarize the main difficulties with the present arrangements before turning to my proposals for resolving them.

Priority

The Department has stated that it recognizes Indian fishing rights, and accords this fishery first priority in the utilization of fish, subject only to the paramount needs of resource conservation (which means leaving enough spawners to replenish the stocks).[20]

But according first priority to the Indian fishery presents a practical problem, since this fishery usually comes last in the sequence of demands on migrating salmon. Indian fishing on the rivers takes place after the much larger commercial and recreational fisheries have taken their catch. Giving priority to the Indians' catch therefore is exceedingly difficult, especially when the size of the total stock is not reliably known until most fishing is completed.

Inevitably, the commercial and sport fisheries sometimes take too many fish to provide sufficient stocks for both needed escapement and the Indian fishery, and by the time this is known the only way to maintain the stocks is to constrain Indian fishing. This problem is aggravated by the fact that the requirements for the Indian fishery are not quantitatively specified. The Department never knows in advance how many salmon in the various runs it should reserve for the Indian fishery, and similar uncertainty is faced by the International Pacific Salmon Fisheries Commission in regulating the sockeye and pink salmon of the Fraser River. To resolve this problem, among others, I propose below that the Indians' first priority claim on the catch be defined quantitatively.

The Permit System

The permit system has been adopted to identify Indian fishermen and to regulate their fishing times and places where this is required. The system is offensive to some Indians and, in communities without a fishery officer near at hand, it is inconvenient.

Certain administrative requirements of these permits are criticized by Indians as being unjustifiable or unnecessarily bothersome. These include the provisions that gear must be marked with identifying tags and that Indians must provide their Social Insurance numbers and band numbers as well as certify that they are Indians under the Indian Act. The administrative practice of restricting fishing in some areas to a few days per week is also criticized. Under the regulations, permits may require the fish to be marked to identify them as Indian food fish by removal of their snouts and dorsal fins, which Indians view with distaste. And some Indians object to the whole system as an unwarranted interference with their fishing rights.

There is another side to all this, however. The permit system enables Indians to fish in ways and areas that are forbidden to non-Indians. Their legal effect is to exempt Indians from general restrictions, such as those on fishing for sockeye and pink salmon in nontidal waters, the use of nets on inland streams and the bag limits that apply to sportfishing. Permits provide the instruments to authorize these special exemptions for Indians.

Permits also provide the means for managing stocks by stipulating fishing in certain places, at certain times and for certain species. As well, they are a means of obtaining needed statistical information on Indian fishing. Moreover, they help to avoid disputes among Indians: by authorizing certain Indians to fish in certain places, the

Department can protect traditional fishing stations from interference by others (and usually does so at the Indians' request). So at least some of the administrative details that are a nuisance to Indians appear to be necessary to identify legitimate Indian fishermen, to manage the resources they use and to enforce the restriction on selling their catch. Some others can be simplified.

A more fundamental issue underlies the Indians' dissatisfaction with the permit system, however. While permits confer fishing privileges that are not available to non-Indians, they have also been the government's means of curtailing Indian fishing. But many Indians feel that their traditional access to fish is their right and not merely a privilege to be meted out by the authorities as they see fit. It has become clear to me that this is the root of much of the discontent and friction that have erupted in the field and spilled over into the courts. Under current policy, Indians view their access to fish to be vulnerable to changes in Indian fishery regulations and the Department's policies, to catches by other, larger resource users, to pollution and other habitat damage, and to the Department's difficulties in managing the resources. Thus, the permit system offers the Indians no security for their claim on the resource. To overcome this I propose below that Indian catches be guaranteed.

Illegal Sales of Fish

The illegal sale of fish caught in Indian fisheries is by no means universal, but it is common in certain areas and draws much criticism from outside observers. The measures taken to control it are irritating to innocent Indians, and it presents an exceedingly difficult enforcement problem for the authorities.

Many Indians resent the prohibition on sales of fish as a denial of their historical practices. In the words of one northern group,

> The idea that the inlan(d) Indian fisheries should be for subsistence only was first introduced in this area in the B.C. Fishery Regulations, November, 1888. Up to that time, and indeed after, it was considered legitimate for an Indian fisherman to trade or sell any of his catch that was surplus to the needs of his family.[21]

The desirability of permitting sales of fish caught in the Indian fishery is debated among Indian groups themselves. Those on the Skeena and Fraser typically support legalization of sales, while those of the Nass valley generally oppose it. But all advocate inland commercial fisheries as a means of economic development.

The refusal of some Indians to accept the legitimacy of restrictions on the sale of their fish makes enforcement particularly difficult. Moreover, many believe that the system has attracted non-Indians to become involved in bootlegging fish taken in up-river Indian fisheries. As salmon have increased in value, the incentives for illegal sales have increased correspondingly, and enforcement has become almost impossible.

These problems would disappear if the restrictions on Indian sales of fish were abolished. This could be done if Indians had the right to specific quantities of fish, as I propose below under certain conditions. This would also meet the fundamental concern that underlies the prohibition on sales: that is, keeping the catch to a legitimate level.

Other Enforcement Issues

In addition to the difficulties over sales of fish, the Indian fishery has a history of abrasive relations between the Department and Indians over enforcement of requirements concerning fishing times, places and other matters. Many Indians find these regulations offensive in principle, others maintain that they are arbitrarily imposed, and others appear to misunderstand them. In the course of public hearings and meetings with Indians, I heard of many incidents in which gear or fish have been destroyed or confiscated and arrests made that have left Indians bewildered or outraged and have often had severe economic consequences for them. These measures are often interpreted by Indian people as harassment;

> . . . Indian people (have) experienced harassment, intimidation, unjustified confiscation of fish, cars and gear, unnecessary and fruitless court action pursued at great expense by Fisheries personnel, constantly using emotionally loaded terms as "massive poaching", "illegal possessions", etc.[22]

For enforcement officers, too, the present arrangements often pose very difficult problems. While they must apply the law with understanding and sensitivity, they are, at the same time, under heavy pressure to closely monitor highly visible Indian fishing.

To help resolve these problems I propose new provisions to clarify in advance the fishing arrangements for particular bands and to enable the Indians themselves to take more of the responsibility for administering them.

Consultation and Participation

A recurrent criticism by Indians is that the Department fails to consult them in formulating regulations for their fishing activity and that this results in difficulties relating to their customary fishing practices. They also claim that their local knowledge is ignored and that they have little opportunity to contribute to fisheries management.

Many Indians have expressed concern that the Department might, without consultation, authorize commercial exploitation of certain minor marine species that they have customarily relied on. They are particularly apprehensive about eulachon. This fish, which has such a special place in Indian food and traditions, is not now widely harvested commercially, but there are recurrent rumours of a potential market for eulachon and hence of its commercial exploitation. Indians are concerned that commercial harvests of the relatively small stocks of this species would soon impinge on their traditional supplies. Similar concerns are felt about licensing commercial harvests of certain types of seaweed that are traditional foods among some coastal bands, and of minor shellfish species. Some argue that the commercial abalone fishery has already interfered with a traditional food source.

In response to these concerns, the Department has made various informal arrangements to improve its communications with those involved in the Indian fishery. Some fishery officers consult with and seek the advice of local Indians, and the Department has recently created at the regional level the position of Indian liaison officer to improve communication with Indian people (although the position is presently unfilled). Regular discussions are held with the bands along the Skeena River, through the Skeena River Advisory Committee, which help the Department determine the escapement required from the commercial fishery to supply the Indian food fishery, as well as to provide for adequate spawning. Both the Departments of Indian and Northern Affairs and Fisheries and Oceans have held frequent meetings with Indian groups in the Pacific region and in Ottawa to confer on Indian fishery issues.

Indian organizations have suggested that more formal consultative structures be adopted to assist both Indians and the Department; suggestions include a representative Indian fisheries board that would implement a "co-management strategy" for developing Indian fisheries,[23] and a board to coordinate management of all Indian fisheries on the Fraser River system.[24] My proposals build on some of these ideas; I suggest a formal consultative body for Indian fishing interests and contractual arrangements to enable Indians to become directly involved in management and enhancement.

Legal Issues

In recent decades Canadian courts have grappled with Indian rights to fisheries and wildlife resources in relation to federal and provincial law-making powers. For Indians in British Columbia this process has been complicated by the fact that few of the bands ever formally relinquished their claims to land and resources under treaties. So, while some Indian claims on fish are based on treaties, most rely on unextinguished aboriginal rights and the Terms of Union between British Columbia and Canada. I review below the issues involved in each of the claims and related legal problems.

Treaties Indian treaties in British Columbia are confined to Vancouver Island and the northeast part of the province. In the 1850s, fourteen "Douglas treaties" were negotiated with various coast Salish and Kwakiutl bands on the island by James Douglas, then of the Hudson's Bay Company. Under these treaties the bands formally surrendered claims to certain lands in return for cash, but they retained their village sites and fields. In addition, in identical language for all treaties, they were given the assurance that they were "at liberty to hunt over the unoccupied lands, and to carry on (their) fisheries as formerly."[25]

Other than the Douglas treaties, the only treaty affecting Indians in British Columbia is Treaty No. 8, signed at the turn of the century between Dominion Treaty Commissioners and several Indian tribes, covering an extensive tract of land in northeastern British Columbia, Alberta and the Northwest Territories. Here, the Indians' fishing rights, according to the text of the treaty, were more qualified:

> (T)hey shall have the right to pursue their usual vocations of hunting, trapping and fishing throughout the tract surrendered as heretofore described, subject to such regulations as may be made from time to time by the Government of the country under the authority of Her Majesty, and saving and excepting such tracts as may be required or taken up from time to time for settlement, mining, lumbering or other purposes.[26]

Despite these formal assurances in treaties, Canadian courts have consistently held that any rights they confer to the Indians over fish and wildlife are subject to federal laws that relate to these resources. Thus, hunting restrictions in the federal Migratory Birds Convention Act have been applied by the Supreme Court of Canada to Indians who were assured hunting rights under treaty.[27] More to the point for this Commission, this principle has been applied to Indians on southern Vancouver Island where one of the Douglas treaties is in effect.[28] So, notwithstanding the assurances of access to traditional fisheries contained in these treaties, Indians are required by law to comply with the regulations under the Fisheries Act respecting permits, gear, fishing times and so on, even though the treaties themselves do not permit such qualifications to fishing rights.

I find these court decisions unsettling. It is hard to avoid the conclusion that they permit the government to unilaterally curtail the Indians' contractual rights embodied in treaties. The editor of a recent law report reached a similar conclusion, in referring to this line of court decisions in an unusually pointed comment as "a sad history of national dishonour."[29]

Canadian judicial attitudes toward Indians' treaty rights in this region contrast sharply with those in the State of Washington, where, under the controversial 1974 "Boldt decision," fishing rights in 5 treaties were interpreted to provide a 50 percent interest in fisheries resources to Indian tribes. Following protracted litigation that came on the heels of the initial court ruling, an umbrella Indian fisheries organization has recently participated with governmental authorities in co-managing the resource, as a means for securing the Indians' share.

Aboriginal rights Most Indians in British Columbia have never formally surrendered land and resources through treaties, however, so their claims to fish rest on their aboriginal rights. All of the mainland (with the exception of the land in the north-east covered by Treaty No. 8), most of the coast, including the Queen Charlotte Islands, and parts of Vancouver Island fall into this category.

In the early 1970s the Nishga Band attempted to obtain judicial clarification of the status of these lands and resources by launching a law suit against the province, basing its claim on unsurrendered aboriginal rights and a 1763 British Royal Proclamation. In its decision, the British Columbia Court of Appeal declined to recognize aboriginal rights.[30] Subsequently, the Supreme Court of Canada, in a fragmented decision, left the issue unresolved and in limbo.[31] Since then, the Supreme Court of Canada has decided that any native aboriginal rights that remain unextinguished are subject to the Fisheries Act and regulations concerning Indian fishing, placing treaty and nontreaty Indians on the same legal footing with regard to fisheries.[32]

Despite the lack of judicial unanimity about the legal nature of aboriginal rights, the federal government announced in 1973 its intention to negotiate with the Indians for the extinction of their claims. This has led to talks with some Indian groups, but by and large progress has been slow.

The recently proclaimed Canadian Charter of Rights and Freedoms provides that "the existing aboriginal and treaty rights of the aboriginal peoples of Canada are hereby recognized and affirmed."[33] But the effect of this guarantee in relation to Indian fisheries is unclear, and so far remains untested in the courts.

Terms of Union When British Columbia joined Confederation in 1871 the Dominion undertook responsibility for Indians and pledged that "a policy as liberal as that hitherto pursued by [the] British Columbia Government shall be continued by the Dominion Government after the Union."[34] The Supreme Court of Canada has since determined that this provision offers no comfort to the Indians of British Columbia.[35] The Fisheries Act and regulations have overriding authority. Inconsistencies in the application of this decision by British Columbia lower courts leave unresolved some important issues concerning the management priority to be accorded Indian fisheries, and I understand that litigation to higher courts on this question is currently proceeding.

Indian fishing by-laws The Indian Act authorizes band councils to enact by-laws covering a wide range of activities on reserves, including fish preservation, protection and management.[36] These may be vetoed by the Minister of Indian and Northern Affairs within 40 days after he is notified of them; otherwise they become effective. So far, such fishing by-laws have been adopted by 10 bands in the region.

To the extent that these by-laws conflict with the Fisheries Act and regulations, their legal status is far from clear. The conflict here is not between federal legislation and the rights claimed by Indians, but rather between two federal statutes. Indians claim that the Indian Act, and hence also the by-laws passed under it, supercede the Fisheries Act and regulations, a contention that has been supported by a legal opinion of the federal Department of Justice. According to this view, band councils can assert regulatory control over fisheries on reserve lands by approving an appropriate by-law without consulting with the Department of Fisheries and Oceans. On the other hand, the Department has taken the position that, in the interests of resource conservation, the Fisheries Act must be complied with in all cases. In the Department's view, the Fisheries Act must therefore have priority; band by-laws should not eliminate the obligation of Indians to obtain permits to fish and to observe their terms, conditions, and other fishing regulations. However, the Department has apparently been instructed to follow the legal opinion.

To date, the Minister of Indian and Northern Affairs has not exercised his power to veto Indian fishing by-laws. And a countervailing authority of the Governor in Council (effectively the federal cabinet) under the Indian Act to regulate fishing on reserves, has so far not been exercised. The effect of this imbroglio is that fishing is carried out on some reserves without regard to the Fisheries Act or its supporting regulations and permit system.

Summary of legal framework All these developments leave an alarmingly ambiguous and incoherent legal framework for Indian fisheries. Treaties and other historical assurances leave Indian fishermen vulnerable to shifts in fisheries policy that may be imposed on them unilaterally by the government. And the band by-law impasse undermines even the scant opportunity offered by the permit system for Indians to be involved in fisheries management cooperatively with the Department. The resulting uncertainty about the legal foundation for Indian fisheries has left the Indians in an unacceptable position and the Department unable to properly manage the resources.

A Commission such as this one cannot purport to adjudicate the legal merits of Indians' claims. That is up to the courts to decide. Nevertheless, it is within Parliament's power to give stronger legal recognition to Indian fisheries, and it is clearly within my mandate to consider the merits of doing so.

A NEW APPROACH TO INDIAN FISHERIES POLICY

Indian fisheries policy cries out for reform. I have identified the major shortcomings and frustrations associated with current Indian fisheries policy arrangements; I now turn to my proposals for change. (Because the arrangements in Yukon are already the subject of an agreement in principle, described in Chapter 20, my recommendations below apply only to Indian fisheries in British Columbia.)

My recommendations are guided by my terms of reference that require me to ensure that they are "conducive to proper management and conservation, to an equitable division of the catch among sectors. . . ." In this context I perceive several urgent requirements: to clarify and strengthen Indian fishing rights; to enable Indians to become involved in fisheries management; to provide opportunities for Indians to take better economic advantage of their rights to fish; and to improve the administrative and enforcement arrangements.

Securing Indian Rights to Fish

My investigations lead to the conclusion that the Indian claim to some fish is legitimate and substantial. This has always been acknowledged, though the legal foundation is weak. But apart from the law, Canadians have a moral responsibility to ensure that this important claim on fish resources is respected. It is inconceivable to me that those Indians who entered into treaties more than a century ago would understand, or could have anticipated, the subtleties of the parliamentary and judicial systems that could override their bargain with the government. And for the majority who never made such bargains to relinquish their claims to land and resources, the moral case is at least as strong.

Canadians, and their governments, pride themselves on Canada's cultural diversity. But no culture in British Columbia is as deeply rooted in the fisheries resources as the Indians'. No other group in our society seeking to preserve its culture can lay claim to the ancient links that have been forged between the Indians and the fish of the region.

At the same time, modern policy towards Indian fisheries must take account of the other demands on fisheries resources that have developed over the past century, including the large commercial industry and the recreational fishery. I propose, therefore, that the Indian claims on fish should not only be acknowledged but should also be made explicit, binding and unequivocal, so that they can be provided for in the context of modern social and economic conditions. To accomplish this, defined quantities of fish must be allocated to Indian fisheries. This will secure the Indian's claim on the available catch and eliminate the legal uncertainty that now surrounds this question. It will also enable the Department to work toward escapement targets, knowing how many fish will be taken by Indians. So my first recommendation is —

1. **The Department should allocate a specific quantity of fish to be available annually to each Indian band involved in the Indian fishery.**

This is consistent with the present (albeit normally unmet) requirement that the quantity of fish to be taken must be specified in permits. It is also consistent with the new fishing arrangements for Indians proposed below.

The quantity of fish to be allocated to each band, and its species composition, should be based mainly on recent levels of utilization, which vary widely among the Indian bands in British Columbia. Other special circumstances should be taken account of as well, such as trends in band populations and their economic opportunities. These should be considered in consultation with the Indians. Accordingly—

2. **The quantity and kind of fish to be allocated to each band should be determined through negotiations with the bands, primarily with reference to their catches in recent years but also taking into account special circumstances relating to population trends and economic opportunities.**

These negotiations should be initiated immediately. In Chapter 17 I propose an Indian fisheries advisory committee for the region, and the advice of this body should be sought in organizing the process.

These allocations should be given priority over all other fisheries. However, unforeseen events or errors in managing other fisheries may require the Department to constrain bands from taking their full allocations in order to meet the paramount needs of conservation. Whenever this happens, the Department should be required to compensate the affected bands by making up the shortfall later. Thus:

3. **The Department should be committed to giving the catch allocated to Indian bands priority over the commercial and sport fisheries. If in any year a band fails to harvest its allocation because of conservation measures imposed by the Department, and if the Department is unable to provide an alternative source of fish, the Department should be required, in subsequent years, to make up the deficiency plus an amount to compensate the band for the delay in obtaining its catch.**

I suggest that the extra increment be determined with reference to prevailing interest rates.

Because the above arrangements are intended to recognize Indians' traditional rights, no royalties should be applied to the fish allocated through them, notwithstanding my recommendation in Chapter 8 for royalties on the commercial catch and my recommendation below that Indians be permitted to sell their catches under some circumstances. Thus:

4. **No royalties should be levied on fish harvested by Indians under the allocations proposed above.**

Forms of Rights

I have already described the considerable variety of administrative arrangements that are now used to regulate the Indian fishery. Particular systems appear to work well for some bands but not for others. This is not surprising in view of the diversity of fishing opportunities, the varying dependence of bands on fish and the range of political organizations and attitudes among Indian communities. Some are anxious to become more actively involved in fisheries management and development, while others appear to be more or less satisfied with existing opportunities. This suggests that the appropriate policy must provide some flexibility.

I propose that Indian bands that are content with the present permit system be given the opportunity to continue under these arrangements with the more clearly defined rights to fish described above. Others who wish to become involved in resource management and enhancement, and are able and willing to accept the responsibilities that this entails, should be encouraged to do so under new Indian fishery agreements proposed below.

I therefore recommend that allocations to bands be conveyed through either of two forms of rights:

5. **Each band should be given the opportunity to choose whether its entitlement to fish will be allocated through Indian fishing permits or a new Indian fishery agreement.**

The character of each of these is described below.

Indian fishing permits The permit system should be geared towards bands that want fish only for food and ceremonial purposes and that do not have an interest in becoming involved in fisheries planning and management. By and large, present policies should be continued for these.

6. **Indian fishing permits should be issued annually to individual fishermen directly by the Department or through band councils. Permits should authorize Indians to take fish for food and ceremonial purposes only. They should specify the quantity and composition of the authorized catch, and the location, time and method of fishing as required for management purposes.**

Later I propose that the Department establish more systematic arrangements for consultation with Indian fishery interests. I expect that through the consultative process some possible simplifications of the permit system can be identified. Moreover, some of the present regulations governing Indian fishing should be reviewed. I am particularly concerned about restrictions on fishing times that have been imposed more or less across the board without sufficient recognition of the needs of either the Indians affected or resource management.

Indian fishery agreements Bands that find the permit system unsatisfactory, and wish to participate more actively in fisheries management and enhancement, should have the opportunity to do so. Indians are well suited to engage in fisheries development activities, because of their historical use of and strong cultural attachment to fish. In Chapter 12 I noted that Indians in this region have been more successful in adapting to commercial fishing than other modern industrial activities. Moreover, their communities are well situated geographically to participate in fish management and enhancement. Most reserves are located on or near productive salmon streams throughout British Columbia: on the coast, they are situated at the mouths of salmon streams and near productive saltwater and shellfish beaches; and in the interior, they are dotted along the reaches of the major salmon rivers.

At present few Indians are able to support themselves on their reserves. In contrast to other parts of Canada where reserves are large, most of the Indian reserves in British Columbia are small. This is due, at least in part, to the opinion of the authorities who set aside reserves, that Indians in this region did not require large areas of land because of their dependence on fish and wildlife. Thus an early Indian Superintendent for British Columbia noted:

> There is not, of course, the same necessity to set aside extensive grants of agricultural land

> for Coast Indians; but their rights to fishing stations and hunting grounds should not be interfered with, and they should receive every assurance of perfect freedom from future encroachments of every description.[37]

Thus most reserves west of the Rocky Mountains are capable of supporting agriculture or forestry only on a very modest scale. In addition, most reserves are isolated, so off-reserve employment opportunities are limited.

While the Indians' orientation toward fish resources justified small reserves, fisheries policy has prevented them from developing economic activity based on fish. What was once an activity that provided a base for commerce as well as food has become, through prohibition on the sale of fish, a subsistence fishery.

To enable Indians to regain the economic opportunities afforded by their access to fish, I propose new Indian fishery agreements that will take the form of contracts between the government and Indian bands. These agreements should have terms of 10 years to provide reasonable security for planning and development; they should contain provisions for renewal at least 1 year before they expire in order to avoid uncertainty as the end of the term approaches; they should incorporate the band's allocation of fish recommended above; and they should permit the bands to sell their authorized catches, under appropriate monitoring and marketing arrangements.

Each agreement should call for an annual fishing plan to be designed jointly by the band and the Department in advance of the fishing season. This will enable the Department to approve fishing times and the demands on particular stocks and ensure orderly harvesting with reference to the cycles of fish abundance.

The agreements should also provide Indians with an opportunity to engage constructively in enhancement activities. Many Indians are interested in becoming involved in enhancement programs, especially for salmon. In Chapter 5 I described the participation of Indians in the Salmonid Enhancement Program through its Community Development Program, but the resources of this program are insufficient to cope with the large number of proposals from Indians. Thus, Indian fishery agreements offer an avenue for broadening this activity without depending on the enhancement program's funds.

Where bands have identified enhancement opportuniies and are willing and able to undertake them, their ndian fishery agreements should enable them to do so nder an attached enhancement plan approved by the Department. And they should benefit from a share of the nhanced production. The share should be set out in the lan, and be fixed with reference to the cost of the nhancement activity, any governmental support eceived and other considerations.

The following recommendation incorporates all these features:

7. **The Department should be authorized to enter into Indian Fishery Agreements with Indian bands. These agreements should —**
   - **i) Carry terms of 10 years with provisions for renewal 1 year before the term expires.**
   - **ii) Specify the bands' allocation of fish.**
   - **iii) Authorize the band to harvest its allocation of fish according to an annual fishing plan determined jointly by the band and the Department.**
   - **iv) Where appropriate, authorize the band to engage in enhancement activities on or near their reserves and to augment their allocated catch by a portion of the enhanced stocks, under fisheries management plans.**
   - **v) Exempt the band from restrictions on the sale of fish under agreed monitoring and marketing arrangements.**

The provision for marketing arrangements is necessary to enable monitoring and inspection of catches and to ensure that health standards are met. I expect that the market channel will normally be an organization of the band itself or an associated corporation or cooperative.

On larger river systems, where several bands hold these Indian fishery agreements, collective planning might be advantageous. Discussions leading up to annual fishing plans, especially, could include all the relevant bands, and might involve tribal councils and other umbrella native organizations.

Administration and Enforcement

An important objective of these new arrangements should be to enable the Indian bands to participate in administration and enforcement. Certainly they are well placed to assist with the allocation of catches among their members, and regulating and monitoring fishing activity. Many Indians want this responsibility, and experience has shown that where they have been given it, the administrative and enforcement problems of the Department have been lessened.

Individual permits issued by fishery officers, band permits administered by band councils, and fisheries management plans of the kind proposed here represent a progression of responsibility into the hands of Indians themselves. As a general rule, the more responsibility successfully delegated to the Indians in this matter, the better, providing that the needs of fisheries management are met.

I therefore recommend —

8. **Where they are willing and able to do so, band councils should be encouraged to take responsiblity for administrative and supervisory functions associated with Indian fisheries. In particular, they should be given responsibility for—**
   - i) **Apportioning the band's allocation of fish among the band members.**
   - ii) **Issuing individual Indian fishing permits where the Department issues a general permit to the band.**
   - iii) **Negotiating with the Department about the band's fishing arrangements and the design of plans under Indian fishery agreements.**
   - iv) **Supervising the bands' fishing and related activities.**
   - v) **Providing statistical and other information to the Department.**

Under Indian fishery agreements the responsibilities of the band council should be set out in the agreement itself.

Since the Department is ultimately responsible to Parliament for managing the fisheries resources, it must have the opportunity and means to ensure that the arrangements for Indian fisheries are properly administered and enforced. The new forms of fishing rights I have proposed, by providing for specific quantities of fish instead of undefined allocations, will shift the focus of enforcement away from compliance with restrictions on fishing time and gear and toward monitoring catches. It is essential that catches under Indian fishing arrangements be reliably monitored and identified. To meet this need I recommend—

9. **Simple tags should be required to be attached to all fish caught under Indian fishery arrangements. The Department should issue sufficient tags to each band to cover its allocation of fish.**

10. **The present regulation requiring Indians to remove the dorsal fins and snouts of their fish should be rescinded.**

The Department requires accurate and timely statistical information about catches in Indian fisheries in order to manage escapements. But these requirements vary considerably as do the bands' ability and willingness to provide the information. So the procedures for reporting catches should be determined jointly by the Department and individual band councils. Where Indian fishery agreements are adopted, the agreed arrangements should be set out in the agreements themselves, and all agreements should pledge the band to cooperate with the Department in providing information and facilitating inspections of fishing activities.

Finally, the legal and administrative uncertainty surrounding band fishing by-laws should be eliminated. Under my proposals above, I can foresee a valuable role for such by-laws in managing and administering the bands' fishing activities on reserves, organizing marketing arrangements and so on. But they must be compatible with the proposed agreements and permits. And the Department, with its general mandate to conserve and manage fish, must be able to monitor these arrangements effectively. I therefore recommend that steps be taken to resolve the conflict between the Indian Act and the Fisheries Act:

11. **The Minister of Fisheries and Oceans should initiate discussions with the Minister of Indian and Northern Affairs and representatives of Indian organizations to find means of reconciling band fishing by-laws with the paramount responsibility of the Department of Fisheries and Oceans for fish conservation and management.**

To a large extent at least, Indian fishing by-laws have been a response to unsatisfactory working relationships between bands and the Department. With the more secure access to fish and the more effective management framework recommended in this chapter, by-laws can become more constructive supplementary instruments for regulating Indian fisheries and advancing fisheries management generally.

Mariculture Opportunities

In Chapter 11 I reviewed the promising developments in mariculture and the considerable opportunities for this activity on the Pacific coast. My proposals for mariculture leases are designed to enable private parties to engage in commercial fish culture and ocean ranching ventures. These offer special opportunities for Indians because of the strategic location of their communities and their familiarity with fish.

Indians should be encouraged to participate in developing mariculture and ocean ranching opportunities, and I suggest that some of the initial pilot projects recommended in Chapter 11 be undertaken by Indian organizations.

12. **The Department should encourage Indian organizations to participate in mariculture and ocean ranching through carefully selected mariculture leases.**

Some imaginative proposals for ventures of this kind were presented by Indian organizations at hearings of this Commission.[38]

I have already emphasized the need for cautious development and careful planning of mariculture and ocean ranching policy. Until satisfactory arrangements are demonstrated, only a few such ventures should be approved. In the long run, however, this form of commercial fishing activity may provide a major base for economic development in Indian communities. Under appropriate arrangements, the allocations of fish to Indian bands proposed earlier in this chapter could be incorporated into mariculture leases.

Assistance

Initially at least, some Indian bands will probably need assistance to take advantage of the opportunities afforded by Indian fishery agreements and mariculture leases. I therefore recommend —

13. **The Departments of Fisheries and Oceans and Indian and Northern Affairs, in consultation with Indian organizations, should explore means of providing technical, financial and educational assistance to enable Indians to develop opportunities under Indian fishery agreements and mariculture leases.**

In Chapter 11 I referred to certain consultations that have already begun on these matters, and suggest that these be pursued vigorously.

CONCLUSION

A major impediment to developing satisfactory policies for Indian fisheries has been the lack of public understanding of Indians' traditional reliance on fish, the cultural and economic significance they attach to these resources, and the complicated legal questions surrounding them. This has generated many of the frustrations and confrontations that have beset Indian fisheries in many parts of the province. The government has an important responsibility to resolve the prevailing vagueness of public policy on this issue and to improve public understanding of it.

Earlier in this chapter I suggested that new policies should be directed toward certain objectives. First, was the need to clarify and strengthen Indian fishery rights. I have proposed, among other things, that this be done by clearly defining Indian rights to the resources quantitatively, and obliging the Department to see that these allocations are provided.

Second, I pointed to a need for Indians to become involved in fisheries management, and my proposals for new Indian fishery agreements and mariculture leases are designed to meet this need. Third, I suggested that new policies should provide opportunities for Indians to take economic advantage of their rights to fish. Thus I have proposed arrangements to allow them to use their catches for commercial purposes and to develop economic opportunities through enhancement and fish culture. Finally, I emphasized a need to improve the administrative and enforcement arrangements governing Indian fisheries. My proposals will lighten the burden of enforcing fishing activity and the way that fish are used, and will enable Indians themselves to participate in regulating their fishing activities.

The proposals in this chapter are intended to provide an improved framework for recognizing Indians' fishing rights. They do not, of course, resolve the legal questions about Indian claims under treaties and aboriginal rights. Those must be dealt with through legal and political processes. My proposals offer means of accommodating Indian fisheries in the meantime, and they should be adopted without prejudice to the ultimate resolution of Indian claims.

In spite of the friction and frustration that has aggravated relations between the government and certain Indians over their fishing activities, I have found in the course of my consultations with Indians a concern to find more constructive arrangements that will enable them to enjoy their fishing rights, while at the same time contributing to resource management and development. My proposals are aimed at providing these opportunities; but to implement them successfully, a major cooperative effort on the part of both Indian organizations and the government is required.

FOOTNOTES

1. Gitksan-Carrier Tribal Council, Exhibit #52, p. 10.
2. The term "Indian food fishery" is criticized by many Indians on the grounds that it implies a traditional dependence on fish for direct consumption only. Fish have historically been important commodities of trade and barter as well.
3. Wilson Duff, Indian History of British Columbia. Anthropology in British Columbia Memoir No. 5, Victoria, 1964. Vol. 1. p. 39.
4. G.W. Hewes, Indian Fisheries Productivity in Pre-contact Times in the Pacific Salmon Area, Northwest Anthropological Research Notes, Volume 7, 1973.
5. Hewes, Indian Fisheries Productivity.
6. The Native Brotherhood of British Columbia, Exhibit #141a, p. iv.
7. W. McKay, "The Native Food Fishery and the Potential Impacts of Oil Spills." A report prepared for the West Coast Oil Ports Inquiry, 1978.
8. Because of the lack of a consistent system of data collection, catches and trends are very uncertain. Some of the increase suggested by these figures may be due simply to improvements in reporting. The figures cited were provided in Department of Fisheries and Oceans, Exhibit #167.
9. Marilyn G. Bennett, "Indian Fishing and its Cultural Importance in the Fraser River System." A report prepared for the Union of B.C. Indian Chiefs and the Fisheries and Marine Service, 1972.
10. W.F. Sinclair, "The Economic and Social Impact of the Kemano II Hydroelectric Project on British Columbia Fisheries Resources, (Vol.II)." A report prepared for the Fisheries and Marine Service, 1976.
11. Edwin, Reid and Associates Ltd., "Working Paper on Indian Food Fisheries and Salmonid Enhancement." A report prepared for the Department of Fisheries and Oceans, 1979.
12. Sinclair, "The Economic and Social Impact of the Kemano II."
13. Nishga Tribal Council, Exhibit #129, p. 4.
14. Edwin, Reid and Associates Ltd., "Working Paper on Indian Food Fisheries."
15. Reuben M. Ware, "Five Issues Five Battlegrounds - An Introduction to the History of Indian Fishing in British Columbia 1850-1930." Prepared for Coqualeetza Educational Training Centre, 1978, p. 14.
16. British Columbia Fisheries Regulations, November 26, 1888.
17. Revised Statues of Canada 1970, Appendix II, No. 10.
18. Union of B.C. Indian Chiefs, Exhibit #133, p. 2,4.
19. Squamish Indian Band, Exhibit #106, Part III, p. 2.
20. Exhibit #167, p. 1.
21. Exhibit #52, p. 26-27.
22. Exhibit #133, p. 18.
23. Exhibit #133, p. 24.
24. Nicola Valley Area Council, Supplementary Document #S-10.
25. See Robert B. Lane and Barbara Lane, "Union of British Columbia Indian Chiefs Fishing Portfolio." 1978.
26. Lane and Lane, "Union of British Columbia Indian Chiefs Fishin Portfolio."
27. The Supreme Court of Canada has acknowledged that such legislation could impinge on previously guaranteed treaty rights in R. v. Sikyea, [1964] 2 Canadian Criminal Cases 325; Affirmed [1964 Supreme Court Reports 642, [1965] 2 Canadian Criminal Case 129, 50 Dominion Law Reports (2d) 8.
28. R. v. Cooper, (1968) 1 Dominion Law Reports (3d) 118.
29. C.A.G. Palmer, "The Unilateral Abrogation of Indian and Eskimo Treaty Rights", 47 Criminal Reports 395.
30. Calder et al v. A.G.B.C., 74 Western Weekly Reports 481, 13 Dominion Law Reports (3d) 64 (B.C. Court of Appeal).
31. Calder et al v. A.G.B.C., [1973] Supreme Court Reports 313, [1973] 4 Western Weekly Reports 1, 34 Dominion Law Reports (3d) 145 (Supreme Court of Canada).
32. Derriksan v. The Queen, [1976] 6 Western Weekly Reports 480 (Supreme Court of Canada).
33. Canadian Charter of Rights and Freedoms, Canada Act.
34. See Revised Statutes of Canada 1970, Appendix II, No. 10, Schedule, Article 13.
35. Jack et al v. The Queen, 100 Dominion Law Reports (3d) 193 (Supreme Court of Canada). In a dissenting judgment, Mr. Justice Dickson stated that the Indian fisheries should be accorded a priority second only to conservation needs.
36. Indian Act, Revised Statutes of Canada 1970 chapter I-6, sections 81(o), 82.
37. Annual Report. Department of Indian Affairs, 1876, p. 32.
38. See The Nimpkish Band Council, Exhibit #156; and The Native Brotherhood of British Columbia Exhibit #198.

CHAPTER 15

THE SPORT FISHERY

The present task of Fisheries is to manage the resource and the recreational user so that one is not sacrificed at the expense of the other.

THE SIDNEY ANGLER'S ASSOCIATION[1]

The salmon and trout of the Pacific coast provide superb sportfishing opportunities. These highly prized game fish, along with the natural beauty and other features of this region, attract sportsmen from many parts of the world. In addition, sportfishing is an important recreational activity for hundreds of thousands of Canadians, many of whom have made it an important part of their lives.

An unusually wide variety of sportfishing experiences is available, from trophy fishing for the impressive chinook salmon and the first-rate experience of river fishing for steelhead to the casual dangling of a line as an excuse to be outdoors. A good deal of commercial activity is now based on sportfishing. All of these are part of the sport fishery, and all have been growing rapidly.

In tidal waters the sport fishery is based mainly on salmon, with chinook and coho being the most sought-after species and pinks being taken when they are available. In addition, anglers catch a range of species of pelagic and bottom fishes (cod, perch, rockfish, flatfish), as well as clams, oysters, crabs, prawns and other shellfish and crustacea. Sea-run cutthroat trout have a special appeal for a select group of aficionados.

Freshwater anglers also seek salmon as they enter coastal rivers and streams on their routes to the spawning grounds. In these nontidal waters, sportfishing is permitted only for chinook and coho salmon. It is here that the highly prized steelhead trout is taken as well.

The Pacific region of the Department of Fisheries and Oceans is responsible for managing the Pacific tidal water sport fishery for all species and for sportfishing for chinook and coho salmon in nontidal waters. It is also responsible for monitoring and regulating all sport fisheries in the Yukon Territory, activities which I review separately in Chapter 20. Responsibility for managing steelhead and other freshwater species has been delegated to the Province of British Columbia. Here I confine my attention to sportfishing in tidal waters where salmon are overwhelmingly important.

SPORTFISHING ACTIVITY

As I noted in my Preliminary Report, discussions of sportfishing activity have been hampered by a great deal of argument and uncertainty about the basic data regarding the scope of this fishery and its implications for management. I must emphasize at the outset that statistical information on the tidal water sport fishery is meagre, and the sport catch of salmon in nontidal waters is for most rivers largely unknown. New sportfishing licences and studies of sportfishing effort and catch are providing useful information but, as I explain in this chapter, the data base remains alarmingly weak in light of the present importance of sportfishing, and this is a serious impediment to effective management.

Numbers of Sport Fishermen

Both tidal and nontidal water sport fishermen 16 years of age and older are required to purchase a sportfishing licence. While a provincial freshwater sportfishing licence has been in place for many years, tidal water anglers were not licensed until 1981. The fee structure and sales of the tidal water sportfishing licences during the first licence year (April 1, 1981 to December 31, 1981) are set out in Table 15-1. These data indicate that tidal water sport fishermen 16 years and older numbered some 282 thousand in 1981. Allowing for those under the age of 16, the total number of anglers was probably about 320 thousand. This figure is somewhat less than previous estimates of 467 thousand for 1979,[2] and 400 thousand for 1980.[3]

Table 15-1 Fee schedule and sales, tidal water sportfishing licence, April 1, 1981 - December 31, 1981

Licence Type	Fee	Number of Licences Sold	Total Revenue
Resident of Canada (annual)	$ 5.00	228,127	$1,138,602
Resident or nonresident (1 day)	3.50	21,948	76,818
Nonresident (annual)	20.00	19,340	386,800
Nonresident (3 day)	10.00	12,832	128,320
		282,247	$1,730,540

Source: Department of Fisheries and Oceans.

Whether the number of licensed anglers in 1981 accurately represents the level of angler participation in recent years is difficult to determine. Early in 1981, in addition to introducing the licensing system, the Department announced a number of conservation measures intended to reduce the sport catch of wild chinook salmon. These, and the ensuing heated debate among sportfishing organizations, created an unsettled climate throughout the year and adversely affected participation in the fishery, particularly the nonresident component. Moreover, in this first year of licensing, compliance was likely less than full. Judging from the licensing experience of the provincial Fish and Wildlife Branch, the impact of new licensing or fees is greater in the first year than in following years.

For these reasons, the 1981 licence sales may underrepresent the normal level of angler participation. Early sales of licences this year appear to be substantially higher than in 1981, but in the current depressed economic conditions 1982 licence sales may not be typical either.

Sportfishing Effort and Catch

While licence sales provide information on numbers of anglers, they do not provide accurate measures of sportfishing effort or catch. Estimates of these, for salmon, appear in Table 15-2. The differences in the estimates in this table are the result of independent studies that differ in scope, the period covered and the statistical methods used.

Table 15-2 Recent estimates of tidal water salmon sportfish catches and angler effort

	Department's estimates presented in Preliminary Report		Tidal Diary Program[b] (1980)		Creel Survey (1980-81)	Share of total catch taken by sport fishermen in the Strait of Georgia[e]
	Georgia and Juan de Fuca Straits[a]	Total Coast	Georgia and Juan de Fuca Straits[c]	Total Coast	Strait of Georgia[d]	
			(thousands of fish)			(percent)
Catch:						
chinook	360-630	400-700	328	391	320	50
coho	630-810	700-900	329	362	553	68
total salmon[f]	n.a.	1190-1690	697	798	895	31
Effort in thousands of angler days	n.a.	2500	710	851	1810	

[a] Statistical areas 13 to 20, 28, 29, A, B and C.

[b] Includes only British Columbia residents over 18 years of age.

[c] Includes Johnstone Strait (statistical area 12) as well as the areas described in (a) above.

[d] Includes areas in (a) above, except area 20.

[e] Based on Creel Survey estimates and average commercial landings in 1979 and 1980.

[f] Includes catch of salmon other than chinook and coho.

Sources: Department of Fisheries and Oceans, Exhibit #172.

M. MacGregor, "The Tidal Sportfishing Diary Program Report on the Pilot Years 1979-80." Prepared for the Department of Fisheries and Oceans, 1982.

DPA Consulting Ltd., "1980-81 Georgia Strait Sportfishing Creel Survey Summary Report." Prepared for the Department of Fisheries and Oceans, April 1982.

The Creel Survey undoubtedly provides the most accurate data. It is based on rigorous statistical sampling of sport fishermen, coupled with overflight surveys and boat counts, and includes all categories of fishermen. But the findings should be interpreted cautiously. The survey covered only the Strait of Georgia (as far west as Beechey Head), and relates to the 12-month period following July 1980 which, as I have already noted, was a period of some turmoil. I do not hold much confidence in the other two sets of statistics which are based on weaker statistical methods that may well bias the results. Moreover, the Tidal Diary Program excludes substantial numbers of nonresidents and fishermen less than 18 years old.

The Creel Survey indicated 1.8 million angler days in the Strait of Georgia alone during 1980, and this probably approaches 90 percent of the total coastwide sportfishing effort. It is directed mainly at coho and chinook salmon, and accounts for a significant catch of these species, as shown in Table 15-2.

The Creel Survey indicated a total sport catch of just under 900 thousand salmon. Since the catch outside the Strait of Georgia is believed to account for something more than 10 percent of the total, the coastwide sport catch was probably about 1 million fish, of which two-thirds were coho, most of the rest chinook, with pinks accounting for a little more than two percent. This is significantly less than the Department's earlier estimates but may be roughly consistent with the estimates from the Tidal Diary Program, taking into account the differences in coverage.

Table 15-2 also indicates the fraction of the total catch of these species in the Strait of Georgia that is taken by sport fishermen, based on the Creel Survey estimates and commercial landings. This suggests that sportfishing accounts for 68 percent and 50 percent of the total coho and chinook catch in this area. These proportions are lower than the estimates that appeared in my Preliminary Report, but they nevertheless show that the sport fishery puts heavy demands on coho and chinook salmon, especially on the particular stocks that appear to be suffering most from excessive fishing pressure (see Chapter 2).

If we assume that the catch in the Strait of Georgia is 90 percent of the total salmon sport catch, and that catches elsewhere are in the same species proportions, then coastwide sportfishing appears to account for 21 percent of the total chinook catch and 15 percent of coho. Taking all species of salmon together, sportsmen account for about 4 percent of the total harvest.

These estimates of sportfishing effort and catch are the best available, and they are more reliable than any previously available. But they hardly provide a solid statistical base on which to build sportfishing policy: they relate to only one year; they diverge from other estimates (insofar as they can be extrapolated over inconsistent periods and areas covered); and they are incomplete. Later in this chapter I return to the implications of this information deficiency for sport fishery management and policy development.

Fishing Success

Sport fishermen do not, on average, catch very many fish. If there were 320 thousand fishermen last year (which, I suggest above, is a conservative figure), and they caught altogether 1 million salmon, their average catch would be less than four fish. The fairly accurate Creel Survey estimates in Table 15-2 suggest that in the Strait of Georgia, at least, sportsmen caught on average one-half a salmon per angler day.

However, the effort and catch is distributed very unevenly among sport fishermen. Almost two-thirds of all sport fishermen fish five days or less, and only fifteen percent fish more than ten days.[4] Ten percent of the fishermen catch more than half of the total catch, while nearly 40 percent catch no salmon at all.[5]

Economic Impacts

Sportfishing has grown to the point where it now generates substantial economic activity based on boats and gear, moorage and other services, and tourist accommodation and guiding. About half of the resident sport fishermen fish from their own boats,[6] and the capital value of the sportfishing fleet is now about the same as the value of the commercial fleet. One study indicated 108 thousand boats were used in 1979 for sportfishing in the Strait of Georgia alone, and these had a capital value of more than $600 million;[7] a more recent estimate is roughly consistent, indicating a coastwide angler-owned pleasure boat fleet in 1980 worth $837 million.[8] Fishing is not the only motive for acquiring boats, of course, but it is apparently the dominant one,[9] with about 60 percent of all pleasure boats being used in sportfishing.[10]

Spending related to saltwater sportfishing on the Pacific coast now approaches $100 million annually.[11] A high proportion of these expenditures are on local goods and services; many of the boats, tackle and other supplies are manufactured locally and virtually all accommodation, food, boat services and so on are supplied locally.

The sportfishing tackle and equipment manufacturing industry has developed along the lines of a cottage industry, especially in the Victoria region. These local manufacturers have demonstrated remarkable entrepreneurial skill and innovation. They now supply most of the local market with lures and tackle and have expanded into foreign markets as well. Their total sales have increased to several million dollars annually.[12]

DEVELOPMENTS IN SPORTFISHING REGULATION

Sportfishing in tidal waters has been subjected to increasingly stringent regulation during the past three decades. A daily bag limit of ten salmon was introduced in 1951; this was reduced to eight in 1959 and four in 1963. The minimum size required for keeping salmon was increased from eight inches in 1951 to twelve inches in 1965 and to eighteen inches for chinook in 1981. Additional restrictions have been put on gear and areas in which sportfishing is permitted.

In 1981, major new restrictions on sportfishing were imposed. Most important was the tidal water sportfishing licence, ending more than a decade of discussions, proposals and debate about licensing. The purpose of licensing is twofold: to provide information about sportfishing for resource managers and to raise revenue from the sport fishery for resource enhancement.

Other regulations introduced last year, designed to reduce the fishing pressure on certain stocks, and specifically to increase chinook salmon escapements in the Strait of Georgia and the Fraser River, have been heavily debated. Equally controversial was the way in which they were introduced. In the context of its urgent concern for conserving the declining chinook salmon, the Department announced on February 11th, reduced bag limits for chinook salmon everywhere on the coast, a winter closure on sportfishing for this species, continued closure of the Fraser River to chinook sportfishing and a ban on the use of downriggers.

Sport fishermen and those with commercial sportfishing interests strenuously opposed these changes and, through the Sport Fish Advisory Board, proposed an alternative seven-point plan, which they maintained would make the same contribution to chinook escapement with less adverse impact on sportfishing opportunities and on supporting industries. A moratorium was put on the announced changes (except for the prohibition on downriggers without quick-releases and the Fraser River closure) while the counterproposal was discussed. The latter was subsequently adopted.

The current regulations governing salmon fishing in tidal waters include a daily bag limit of four salmon, only two of which may be chinook during the winter period (December 1st to March 31st). The possession limit is two daily bag limits, or eight salmon. An annual bag limit of 30 chinook is enforced by means of a punchcard system. Regulations govern the number of lines that may be fished from a boat, and downriggers without quick-release devices are prohibited. The minimum size limit for chinook salmon is 45 cm (18 inches) and 30 cm (12 inches) for other species.

In addition to these broad regulations, special restrictions have been imposed on the size and number of fish that may be taken in certain areas, and provisions have been made for spot closures for conservation purposes.

Earlier this year, new restrictions were announced as part of a program to "halt the decline in chinook salmon stocks in British Columbia . . ."[13] Coupled with measures to restrain further the commercial catch of this species, reduced bag limits for sportsmen were imposed in northern waters.

My investigations have revealed that there is currently no monitoring program of the kind needed to identify the impact of such regulatory measures. So their effectiveness is unknown. And the analysis on which the recent restrictions on sport fishermen were based was rudimentary at best.

We are left with little to judge the efficacy of sportfishing regulations in meeting their objectives. Moreover, the effect of the new controls will take years to assess and I fear that in any event, the Department lacks the base-line data needed to measure their impact.

This void of reliable data generates much of the contentiousness of sportfishing policy. The majority of sport fishermen, and certainly most sportfishing organizations, are clearly willing to accept the controls needed to conserve the resources on which their recreation depends. But equally clearly, they will be receptive to such measures only if there are reasonable grounds for believing they are necessary and will have the desired effect. Until the Department has better information to support changes in regulations, it will remain vulnerable to criticism and obstruction. Without the support and confidence of the sportfishing community, both resource management and sportfishing opportunities are likely to suffer.

PRIORITIES FOR SPORTFISHING POLICY

I turn now from our present position to directions for the future. We clearly face both challenge and opportunity: the challenge of coping with intensifying competition for salmon among commercial, recreational and native Indian user groups; and the opportunity to develop a clearly defined policy that reflects the needs of each competing group.

Priority must be given to the development of a reliable information system upon which effective management decisions can be based. In the meantime, sportfishing policy should be cautiously conservative and as uncomplicated as possible. It should be designed as a base to which refinements can be added as information accumulates about the resources and the impacts of fishing. This, in the long run, should provide scope for a richer diversity of sportfishing opportunities.

Sportfishing in Fisheries Policy

Until relatively recently, sportfishing was of little consequence to resource managers. But recent expansion of sportfishing, in conjunction with intensifying demands on the resource from other users, has created a need for a coherent sportfishing policy. The Department has begun to recognize this, but its approach to sportfishing remains awkwardly integrated with overall fisheries policy. In the Department's words:

> The broad objective of recreational fishery management is to accommodate as far as possible the needs of the growing recreational fishery without major negative impacts on the other user groups.[14]

This rather vague and reluctant attitude is inadequate in view of the present numbers of sport fishermen, the importance of sportfishing and its heavy demands on certain stocks. With the present competition for the available harvest, the sport catch must inevitably encroach on that of other groups, and vice versa.

Sportfishing organizations commonly perceive that sportfishing receives short shrift from the Department:

> It is quite obvious that the Department does not have a recreational fishery policy. They do not recognize sport fishermen as legitimate users of the resource . . . .[15]

Support for this criticism is plentiful: the Department has never had a sportfishing branch; the statistical series on sport catches was abandoned a few years ago; currently only two or three of the Department's staff are concerned mainly with recreational fishing; and recognition of sportfishing in fisheries legislation is desperately lacking.

The resulting distrustful attitude of sport fishermen is not conducive to cooperation and support. Dispelling it should be the first step in sportfishing policy reform. This could be done with an unequivocal policy statement and commitment to sportfishing. Hence I recommend that:

1. **The government's policy should explicitly recognize sportfishing as a legitimate, valuable and significant use of fish resources, and this should be reflected in a commitment of staff and budget.**

In other circumstances such a policy statement would be unnecessary. But in the current circumstances an explicit policy statement committing the Department to sportfishing management is the necessary first step toward improving its credibility among sport fishermen and generating the needed confidence and support of the sportfishing community.

The Department cannot identify how much manpower and expenditure is now devoted to sportfishing because there is no administrative centre with sportfishing responsibility; but it estimates that sportfishing management and enforcement, dispersed among personnel concerned mainly with other matters, accounts for some 17 person-years and $200 thousand in other costs. I cannot say what an adequate provision would be (in Chapter 19 I propose a Departmental review for such purposes), but given a regional budget of $85 million and a staff of over 1,200 I have no hesitation in concluding that the present provisions are insufficient.

Policy Objectives

The general policy objective prescribed in my terms of reference is to ensure that the resources are used in a way that will yield maximum social and economic benefits. This raises two fundamental questions for sportfishing policy: how much of the available catch should be allocated to sport fishermen, and how this share should be allocated among them? Both of these questions call for an understanding of the essential values generated by sportfishing and how they are affected by regulatory methods.

Sportfishing values The value generated by sportfishing cannot be measured simply by determining the value of the fish caught. This is a relevant measure of the values generated by the commercial fishery, but it is only incidental to the value of sportfishing, which is derived primarily from the associated recreational experience. The quality of this experience is undoubtedly affected by the opportunity to enjoy a good catch, but the fishing opportunity, not the market value of the fish themselves, is what excites most sport fishermen. This explains why most sport fishermen spend far more on fishing equipment, supplies and services than it would cost to purchase their catch on the market, and why many enjoy fishing even though they do not catch fish or do not take them home to eat.

Nor can the benefits of sportfishing be properly measured by calculating the expenditures on fishing equipment and services. A sportsman will go fishing only if he expects that his enjoyment will be worth more to him than the outlays he must incur to fish. The net benefit is, therefore, the excess of his enjoyment over his costs. Expenditures on boats and other goods and services referred to earlier in this chapter indicate the amount of economic activity generated by the sport, but so far as the value of recreational fishing is concerned they are more indicative of the costs than of the benefits.

The value of sportfishing, in terms comparable to the economic value of other goods and services, is most appropriately measured by the amount of money sport fishermen would be willing to pay for it, not by what they buy to compliment their fishing. There is a good deal of confusion about this. The value of a movie, for example, cannot be measured by how much the viewer spends on transportation to the theatre and on popcorn or babysitters, but by how much he is prepared to pay to see the show. In the case of movies, entrepreneurs charge what the market will bear and their receipts reflect the value of their product to the public. In the case of sportfishing, the government does not charge what the market will bear, but nevertheless, the users' potential willingness to pay is the correct measure of the value of sportfishing opportunities.

Because Canadian governments do not try to maximize returns from sportfishing, the benefits accrue, for the most part, to the anglers themselves rather than to the resource owners (the people of Canada) generally. This policy can be defended on socio-political grounds, but it has the incidental effect of leaving no direct economic indicators of the values generated. This can be estimated only from indirect evidence.

Studies conducted in British Columbia, Washington and Oregon indicate that the average sport fisherman would be prepared to pay about $15 per day for the opportunity to participate in general saltwater fishing, and $25 per day for trophy saltwater sportfishing and for steelhead freshwater angling.[16] These are crude estimates, and they were made in 1977, but they indicate the appropriate kind of measure for determining the value of sportfishing. If the $15 per day figure were applicable to saltwater sportfishing in 1981, the aggregate value generated by sportfishing in tidal waters would have been about $30 million.

The true value of sportfishing opportunities in this area is governed by the quality of the recreational experience those opportunities offer. Therefore, recognizing the factors that affect the quality of the experience is crucial in designing sportfishing policy. The opportunity to catch fish is central, but many other factors are involved.

> . . . if the salmon is the key or the axle of the wheel, perhaps the other factors [fraternity, the desire to become a better fisherman, the competitive aspect and the opportunity to get away from job pressures, family commitments and social obligations] are the spokes and rim of the wheel which turns the motivational crank — giving us a more complete picture of what sportfishing is and what it means to the people that participate in it.[17]

Many of these factors are beyond the scope of fisheries managers, who obviously have little influence on such things as the weather, scenery and comradship. But fisheries authorities have in their hands the essential key to an exciting recreational experience: they regulate the opportunity to catch fish. And by regulating access to the fish, fixing bag limits, imposing gear restrictions, and making other rules, they control whether a sport fisherman can, with a little luck, a little skill, and some dedicated effort, take a satisfying catch.

> The essential motives in sport fishing are hope and the gamble. The hope is that a day on the water will produce a few nice fish. Time and money are spent for this gamble. The sure way to kill the urge to go sport fishing is to remove these two motives . . . . A fisherman will go out day after day and not catch a single fish. If he is told he can only go out and catch one fish, and can't even use his favourite tackle, then the hope and fun of the gamble is removed and he ceases to want to go fishing.[18]

To enhance the value of sportfishing, therefore, regulatory authorities should strive to preserve and develop the opportunity to catch "a few nice fish," and policies should be considered in terms of whether they will increase or diminish this opportunity within the constraints imposed by the limited available catch and other users.

Basic choices The basic choice is between spreading the available catch among more fishermen, which enables a greater number to participate but reduces the quality of the experience for each, and controlling the numbers, which enables a smaller number to enjoy a more valuable fishing opportunity. Historically, regulation has favoured the former: sportfishing has been freely accessible to everyone, with the catch being controlled by progressively reducing the numbers of fish that each may retain, and by gear restrictions and closures. These controls have been advocated because they do not limit the number of fishermen who may participate. But as long as the number of potential sport fishermen continues to grow, and the available catch does not keep pace, this policy implies that individual catches will progressively deteriorate, as will the value of the sportfishing opportunities. Judging from reactions, this point may have been reached with the proposal last year to reduce the bag limit for chinook salmon to one fish. Obviously, any further reduction would virtually eliminate that sportfishing opportunity.

The alternative approach is to control the total pressure on the stocks by regulating access and reducing the expansion in numbers of fishermen, thereby preserving their opportunity to take a satisfying catch. With the continuing growth in sportfishing demand, the bleak prospects for significantly increasing the catch available to the sport fishery in the near term, and the modest bag limits that now exist, sportfishing policy should be directed toward this latter alternative for the time being.

I therefore recommend this change in policy direction:

2. **Sportfishing policy should aim at preserving the quality of sportfishing opportunities, which implies dampening the rate of growth of sportfishing effort and maintaining average catches until the available harvest can be increased.**

In Chapter 4 I discuss the opportunities for increasing the available stocks through improved escapement, and in Chapter 5 I explain that enhancement efforts may increase chinook and coho stocks in the Strait of Georgia. But whether or not these measures are effective, management of the sport fishery requires regulating sportfishing privileges and improving information on the impacts of sportfishing. These are the issues I turn to in the remainder of this chapter.

REGULATORY ENDS AND MEANS

The basic instrument for regulating access to sportfishing is the licence, now finally in place. The privileges and obligations embodied in these licences offer fairly flexible means of achieving sportfishing objectives. I propose that the tidal water (saltwater) sportfishing licence system be retained, simplified in certain respects, and modified to better serve policy goals.

Licences

First, I propose that the federal saltwater sportfishing licence and the Province of British Columbia's freshwater sportfishing licence be integrated into a single document. Many sportsmen participate in both saltwater and freshwater fishing, and the proliferation of fish and wildlife authorizations from both governments with their separate networks of issuing agents has become a considerable nuisance. The governments should provide simple and convenient licensing arrangements, and by engaging the same agents they may realize certain economies as well.

3. **The governments of Canada and British Columbia should cooperate in integrating the saltwater and the freshwater sportfishing licences, so that both can be acquired through a single document, which all agents should be authorized to issue.**

The most expedient system would appear to be a stamp for each of the two fisheries, either or both of which may be affixed to a single sportfishing licence document. I understand that officials of the two governments have already examined the feasibility of joint arrangements, and while no unmanageable technical difficulties seem to exist, the financial arrangements have not been made.

In the longer term, the feasibility of extending the licensing system to cover younger fishermen should be examined. The present exemption for those under 16 is presumably in place to avoid burdening children financially, but an alternative is to require them to hold licences issued at nominal or no cost. This would bring all fishermen within the framework of the regulatory system and provide more comprehensive data. Any such change would obviously be more suitable if made in conjunction with a conforming change in provincial freshwater licensing, I therefore propose—

4. **The governments of Canada and British Columbia should examine the feasibility of extending the sportfishing licensing system to include younger fishermen perhaps under licences issued at nominal or no cost.**

This change could have the incidental benefit of engendering greater appreciation among young people of sportfishing opportunities and the need for resource conservation. It would also deter the alleged practice among some sport fishermen of attributing their catches to accompanying children to circumvent bag limits.

Licence Fees

The current saltwater sportfishing licence fees are very low, and fall well short of the value of the fish caught by average sport fishermen. Indeed, the annual $5 fee for residents is much less than the value of an average salmon. So, in order to bring the fees closer to the value of the resources used, and to support my proposals for a greater commitment to a sportfishing information and management system, I recommend that—

5. **Saltwater sportfishing licence fees should be doubled.**

This change will bring the saltwater fees roughly into line with the province's freshwater fees, though there remain differences among categories, and these should be reviewed. In Chapter 5 I propose that half of the sportfishing licence revenue be directed toward the enhancement effort and that the remainder support the expanded sportfishing management and information program I recommend below.

In addition to raising more revenue, higher fees will tend to dampen the growth in numbers of sport fishermen by deterring those who put only a marginal value on the sport. They will thereby assist in preserving the quality of sportfishing opportunities.

Some people object to the idea of higher charges for sportfishing privileges on grounds that they would impinge most heavily on the poor. This is a worthy concern, and it is for this reason that special rates are often provided in licensing systems for old-age pensioners and others. But sportfishing licence fees are generally rather trivial in comparison with the other substantial expenditures that most anglers incur in order to sportfish, so the argument that an increased fee is unfair is not very convincing. Moreover, sportsmen must recognize that the fish they take are very valuable, and they could alternatively yield significant value in the commercial fishery. Sportfishing opportunities on the Pacific coast are exceptionally attractive, and it is reasonable for those who use the resources to pay for the privilege, as my terms of reference imply they should.

Punchcards, Tags and Annual Bag Limits

As I explained earlier in this chapter and elsewhere in this report, the need to constrain fishing pressure on the chinook and coho stocks that support most sportfishing is urgent. The proposals set out here are designed to do so without eroding further the quality of sportfishing opportunities.

The present licence includes a punchcard which limits the bearer to an annual catch of 30 chinook salmon. This arrangement has several shortcomings:

i) The best available information, some of which was referred to earlier, suggests that an annual bag limit of 30 chinook salmon will have very little impact on the total catch because so few fishermen catch significantly more than this.

ii) It requires sport fishermen to distinguish between the species of salmon, but many casual fishermen are probably incapable of doing so.

iii) It does not apply to coho salmon, but recent information suggests that many coho stocks, like chinook, need urgent conservation.

iv) By applying to chinook salmon only, it bears more heavily on sport fishermen in those areas where chinook salmon predominate.

v) It constrains all fishermen to the same generous limit, though most will catch less and a few would be prepared to pay to catch more.

To correct these deficiencies and to maintain the quality of sportfishing opportunities, I propose the following:

6. In 1983, the saltwater sportfishing privilege should embody a punchcard limiting the holder to 30 salmon regardless of species.

7. Simple plastic tags should be available at a price of $2 each, and should be required to be attached to all salmon in excess of a licence holder's punchcard limit.

The relative advantages of tags and punchcards have been studied at length. Most observers agree that tags are a better means of regulating catches than punchcards because they are more flexible and, being visible, promote better compliance; but they are much more costly. My proposal is aimed at providing the flexibility without the high costs. With the punchcard entitling each licensee to 30 salmon, relatively few will purchase tags (recall that nearly 40 percent catch no salmon at all, and few, perhaps 6 percent, catch more than 30 per year). Moreover, I propose minimal administrative requirements, which is the main source of estimated costs of tag systems. I intend that they be simple plastic tags detachable from a sheet, like those used in New Brunswick, and that they be issued without restriction at the same price for all categories of licence holders. No attempt should be made to prohibit transfers, which means no records need to be maintained to identify particular tags with particular licences.

These arrangements will provide all sport fishermen with an equal opportunity to catch salmon; the most ardent will be able to continue to take large catches providing they pay extra for their heavy demands on the resources; the different salmon species and the different geographical groups of fishermen who depend on them will be treated more appropriately; and the revenues from sportfishing will be more closely related to the value of resources used.

Nonresident Sport Fishermen

Over 30 thousand nonresidents purchased licences to fish on Canada's Pacific coast last year. These visitors make a substantial contribution to the tourist industry, and many resorts, charterboat operations and service establishments depend mainly on them.[19]

Judging from the apparent willingness of many foreign fishermen to pay to fish in Canada, particularly on the west coast, the goal of maximizing economic and social benefits from the resources suggests that opportunities for this category of sport fishermen should be maintained. But in contrast to fishing by Canadians (where the benefits of recreational enjoyment accrue to Canadians whether they are paid for or not), the benefits to the people of Canada from sportfishing by foreigners arise almost entirely from their expenditures on sportfishing. Indeed, insofar as they use fish that would otherwise be available to Canadians, they impose a cost.

For these reasons, a heavier fee on foreign sport fishermen is justified. My earlier recommendation to double fees will have the effect of raising the annual licence for nonresidents to $40 and the three-day licence to $20 and so no further change is warranted for the time being.

The Charterboat and Guiding Industry

Rapid growth in sportfishing over the last two decades has substantially increased the demand for fishing guides, charterboats, accommodation and a host of other goods and services. For present purposes I will set aside all those shore-based businesses that supply goods and services to fishermen, such as tackle, accommodation, bait, and so on, because they are only indirectly influenced by fisheries policy. Here I am concerned with operations that provide sportsmen with professional assistance in fishing in the form of vessels, vessel operators and guides.

Charterboat clients are motivated by the same qualities of sportfishing opportunities as are other sport fishermen, and the operators offer a useful service that broadens these opportunities.

> . . . the industry is affected by two overriding factors, the ability of potential clients (the public at large) to pay for a sportfishing experience, and the perceived likelihood that his expenditure will be justified in terms of recreational value and the opportunity for a good catch.[20]

Despite a surprising amount of debate about whether guiding and charterboat operations constitute recreational or commercial fishing activity, I have no hesitation in classifying these businesses as commercial. However, they differ fundamentally from the sector usually referred to as the commercial fishery; whereas the commercial fishing industry is based on the production and sale of fish, the charterboat and guiding industries are concerned with the provision of sportfishing services and facilities. The fees charged by these businesses and their total incomes are not closely correlated to the number of fish landed by their clients.

Charterboat operations Charterboat operations take a variety of forms, which can be roughly categorized into four groups: *floating resorts*, which are large ships, typically stationed in remote areas near superior fishing grounds, that provide a full range of hotel accommodation and services to sport fishermen; *guided charters*, which are typically vessels of 12 to 45 feet hired with a guide for an hourly or daily fee; *party boats*, which offer "fun fishing" to large numbers of novices at low cost; and *guide services*, which may be provided independently of vessel rental arrangements at an hourly or daily rate.[21]

Small boats available for hire without an operator or guide are not appropriately classified as charter operations; "bareboat" rentals are analogous to rentals of tackle and accessories, and are not a special issue in fisheries policy.

Like so many other matters relating to the sport fishery, statistical information on the charterboat industry is very sparse, and until last year virtually nonexistent. Through a voluntary registration program for guides and charterboats undertaken by the Department in 1981, some 500 guides and operators and 600 boats were registered, and these are believed to represent roughly 80 percent of those active in the industry.[22] A supplementary mail survey of those registered, which aimed at obtaining more information about the nature and scope of the industry, was not successful: few responses were received due to a lengthy postal strike, resentment over recently announced sportfishing regulations, suspicions about the Department's reasons for conducting the survey, and depressed economic conditions that closed some operations for the entire season.[23] At the same time, a Sport Fishing Guide Log Book was distributed for voluntary completion and return, but again the response was low, so that reliable information on the charterboat industry remains sparse.

Charterboat licensing The dearth of information about this important and expanding sector of the fisheries and about its resource utilization is a serious impediment to effective management and policy development. I therefore propose that charterboats be required to obtain licences, like other commercial fishing vessels, for the primary purpose of obtaining data on the size and structure of the industry and its catches:

8. Those who provide vessels with guides for sportfishing should be required to obtain a licence for each charterboat.

- **i) The licence should be issued by the Department at an annual fee of $50.**
- **ii) Licensees should be required to maintain a simple logbook for each vessel documenting the number of persons fishing, their catches and related information for the Department's use.**

Compliance with the logbook requirement should be enforced through powers to cancel or refuse to renew a licence.

The proposed licence fee is the same as I propose for other commercial fishing licences. It is intended to defray administrative costs only. For purposes of raising revenue and capturing some of the economic rent, direct levies on the sport fishermen themselves, through fees for licences and tags, are more appropriate. Given these general charges on all sport fishermen, additional contributions from those who provide sport fishermen with certain services cannot be justified. Nor is there any justification for special levies on charterboat operators as distinct from operators of shore-based establishments that serve sport fishermen.

Some have suggested that charterboat licences should be limited, like some other commercial fishing licences. But for the latter, the purpose is to control the growth of fishing capacity so that it does not exceed the level needed to harvest the catch. This threat does not exist in the commercial sportfishing sector, so no comparable restrictions are needed. This industry grows as demand for its services grows, much like the hotel and other tourist industries; and (unlike overcrowded commercial fisheries) as it grows, production grows also.

Some of the concern expressed at the Commission's hearings to restrict the charterboat industry stems from a broader concern to control the sportfishing catch. The share of the available catch allocated to sportfishing is unquestionably an important issue in fisheries policy, and the catch of the users of charterboats is part of the sport catch. But whether sport fishermen choose to use their own fishing equipment and expertise or to hire them is not a matter for governmental concern.

Fisheries policy should interfere as little as possible with the choices of fishermen about how they choose to fish and, within the limits of the available sport catch, accommodate as much variety of choice as possible to enrich recreational opportunities.

Policy should avoid discriminating among sport fishermen on the basis of the services they employ or among service businesses. My proposal regarding licensing of charterboat operators is thus directed at closing an important gap in the information required for effectively monitoring and regulating the sport fishery.

Sportfishing guides The 500 or so saltwater sportfishing guides work on a wide variety of vessels and under varying arrangements with customers and employers. Some are full-time career guides, often with substantial investments in vessels and equipment and long experience; a larger number are seasonal employees — students and men and women who take other winter employment. They are unorganized except for one or two local associations, which are concerned mainly with market promotion.

Hitherto, saltwater sportfishing guides have been unregulated. But a form of regulation by licensing, akin to the licensing of guides for hunting and freshwater fishing by the British Columbia Fish and Wildlife Branch, was frequently suggested in the Commission's public hearings and meetings. The arguments most frequently used to support this position are as follows: it would identify those involved in guiding and improve communication and a sense of professionalism among them; it would provide a vehicle, through suspension or cancellation, for enforcing safety rules and fishing regulations; it could be used as a device for establishing standards of service and qualifications; and it could be a means of raising revenue. But as others have pointed out, the Department of Transport regulations already cover matters of safety, other means are available for enforcing fishing regulations, and the other issues are mainly the business of guides themselves. Furthermore, easily available and even casual guiding services are a valuable adjunct to the tourist industry and provide considerable summer employment, which few would want curtailed.

In addition, the licensing of charterboat operations, already recommended, will go a long way toward identifying the size and scope of the guiding fraternity. Insofar as they operate as employees of licensed operators, and the operators are responsible for ensuring that regulations are obeyed and the necessary logbook information recorded and reported, I can see no useful purpose to be served by licensing guides as well. To do so would add an unnecessary administrative burden and expense to the Department and, in the eyes of some anglers, it might imply that the Department has approved the qualifications of guides, an implication the Department should avoid. However, any voluntary organization of guides, as long as it is not aimed at restricting competition, should be encouraged. For these reasons I have concluded that the Department should not become involved in licensing sportfishing guides, at least at the present time.

Sportfish Regulations

In addition to licences and general bag limits, the Department has developed a host of regulations regarding the fishing gear sportsmen may use, the size of fish they may keep, areas they may fish and so on. All of these were discussed at length in my public hearings. Because the usefulness of such measures varies with circumstances, and because we know so little about their impacts, I make no specific recommendations.

Sportfishing regulations of this kind should be designed to protect the stocks from destructive fishing methods. Beyond this, I make no specific recommendations about them, because they should be applied discriminatingly and invoked or modified in consultation with the sportfishing community. Later in this chapter I propose a temporary ceiling on the aggregate sport catch, and these regulations should be considered as means of complementing that objective. The following comments consist of relevant observations that have arisen from my investigations.

Spot closures In areas where immature salmon congregate or where mature adults concentrate as they approach spawning grounds, uncontrolled fishing can be very destructive to the stocks and so the policy of closing such areas is justified. During the last couple of years the Department has invoked spot closures more frequently and more discriminatingly for both commercial fishing and sportfishing.

Some commentators at the Commission's hearings have advocated much more flexible use of spot closures, particularly to protect concentrations of immature fish, including temporary "mini-closures" where schools of young fish pause on their migration routes. The scope for such measures is limited, however, by practical considerations. Hitherto, the Department's power to invoke closures has been constrained by a legal requirement to describe and authorize a closed area in a formal regulation passed by the federal Cabinet through an Order-in-Council and an advertisement in the Canada Gazette. In Chapter 4 I propose that this impediment be eliminated. But other obstacles remain. Closed areas must be readily identifiable by all fishermen, so their boundaries must be marked by recognizable natural geographical features or artificial markers. The latter are inevitably costly, especially for temporary purposes. More problematical is the need to inform all sport fishermen of areas closed, not just the local fishermen but also those who might be passing through.

Sportfishing management could undoubtedly be improved by greater use of spot closures in appropriate circumstances, and the opportunities may be increased through cooperative arrangements with local sportfishing organizations in certain areas. But practical difficulties limit the feasibility of imposing many small, temporary closures that might otherwise be desirable.

Size restrictions Size restrictions can prescribe either minimum or maximum sizes of fish that may be retained; but apart from certain special rules governing river fishing, only the former have been applied on the Pacific coast. The minimum size limits of 45 cm (18 inches) for chinook salmon and 30 cm (12 inches) for other species are intended to be conservation measures to protect immature fish. But whether they are beneficial is questionable. The limited evidence available here and in the United States indicates a high mortality among fish released and that mortality is highest among small fish, especially when they are handled and unhooked by inexpert fishermen. As long as a daily bag limit applies, total fish mortality might actually be reduced by permitting fishermen to keep small fish and including them in their bag limits.

Several factors are relevant to whether this is the case: the frequency of hooking "shakers" relative to "keepers"; the mortality rate of released, undersized fish; the normal survival rate of juvenile fish to their adult stage; and the numbers of small fish that would be kept by fishermen if they were permitted to do so. As with so many sportfishing questions, little data is available on these relationships, but it may well be that size limits combined with bag limits have a perverse effect on overall fish mortality.

Size restrictions also reduce the diversity of sportfishing opportunities.

> Various sized fish also appeal to various anglers. The thrill of a child with a fish of any size and the desire of many elderly anglers to retain just a couple of grilse to satisfy their modest appetites and demands comes to mind. So does the desire of the expert to catch a large fish and together with that expertise, the ability to release small fish unharmed.... An open-ended, voluntary release, no size limit fishery would not have an adverse effect on salmon stocks in the aggregate; it would enhance the recreational opportunity and experience for many anglers and it would constitute a simple solution to a needlessly complex and over-exaggerated problem that can not be proven to exist.[24]

Compulsory retention of all fish caught has been suggested, but this would be unenforceable, and bag limits would encourage violations. On the other hand, voluntary retention of any fish would undoubtedly reduce the enforcement burden and increase the satisfaction of many casual sport fishermen. So in the absence of evidence that size restrictions serve a useful conservation purpose, they might best be abolished in favour of more effective measures such as spot closures in areas where juvenile fish are concentrated.

Gear restrictions Restrictions on certain kinds of fishing gear such as barbed hooks, treble hooks and downriggers are highly controversial, and the arguments in favour of them vary. Some suggest that certain types of gear should be banned because they are not sporting. The government should avoid regulations based on such ethical judgements: they are inevitably subjective, and they discriminate against those who fish by certain methods and in certain conditions as well as against less experienced fishermen, who may nevertheless gain great satisfaction from catching fish.

Others advocate such restrictions in order to reduce the sport catch. Any gear restrictions undoubtedly tend to reduce fishing success, but since other means of control are available, such as licence fees and bag limits, it is questionable whether this objective should be pursued by making it more difficult to catch fish.

Still others argue that restrictions on gear, such as treble and barbed hooks, will reduce the mortality of released undersized fish, which is the purpose of the barbless hook rule imposed on commercial trollers last year. This latter case is persuasive; treble and barbed hooks are often extremely difficult to remove without mortal damage to a small fish. The justification for prohibiting such gear is particularly strong given minimum size limits for landed fish. But even without size limits, since most fishermen will choose to release small fish, prohibiting barbed or treble hooks may be justified.

Restrictions on river fishing The freshwater salmon sport fishery is an important component in the range of sportfishing opportunities. In recent years much heavier restrictions have been placed on sportfishing in freshwater rivers and streams than have been imposed on ocean fishing for the same fish. Sportfishing for chinook salmon is now prohibited in major parts of the Skeena and Fraser river systems, for example, and no sportfishing for pink, chum or sockeye salmon is permitted in any nontidal waters.

Sportfishing policy should aim at providing opportunities wherever they generate the greatest recreational value, and the rarer and more esoteric experience of river fishing for salmon and steelhead suggests that some fish allocated for this activity will generate higher recreational value than the same fish caught at sea.

The disproportionate restrictions on river fishing undoubtedly reflect concern for conserving spawners. But fish caught at sea are also potential spawners, notwithstanding their different survival rates to the spawning beds. In designing controls, therefore, account should be taken not only of the relative impact on the stocks of taking fish at sea and in rivers, but also of the relative value of sportfishing opportunities.

A SHORT-TERM STRATEGY FOR MANAGING THE SPORT FISHERY

Earlier in this chapter I suggested that maximizing the economic and social benefits from our fish resources calls for allocating the available catch between the sport fishery and other fisheries in proportions that will generate the greatest value. I have also pointed to the disturbing void of reliable information about sportfishing that prevents the necessary evaluations from being made. Nevertheless, we know that sportfishing depends mainly on chinook and coho salmon, that sportsmen take a large proportion of the catch of these species, especially in the Strait of Georgia, and that these stocks are under especially heavy fishing pressure and in need of conservation measures (as pointed out in Chapter 2). So despite our present ignorance about many aspects of sportfishing and the resources it depends on, I recognize a responsibility to propose a more clearly defined course of action to guide sportfishing management and protect overfished stocks during the next few years until a firmer foundation for policy direction can be laid.

I therefore propose a five-year program aimed at constraining the growth of sportfishing pressure on the resource while maintaining high-quality sportfishing opportunities. I have already recommended certain changes that will tend to dampen the rate of increase in sportfishing, particularly the doubling of licence fees and the punchcard-tag arrangements. For the next five years I propose a specific ceiling on the aggregate sport catch and supplementary controls to achieve this. During this period improved management of the commercial, Indian and sport fisheries, and enhanced production should be capable of reversing the declines in important sportfishing stocks. At the same time, the information program I propose later in this chapter will provide the essential data for meaningful consultations with the sportfishing community, so that more positive sportfishing policy can be developed for the future. Specifically, I recommend—

9. **For the next five years, the Department should aim at providing an annual coastwide sport catch of 1 million salmon, of which not more than 900 thousand should be taken in the Strait of Georgia and Fraser River systems.**

According to our best information, described earlier in this chapter, these proposed targets are close to current levels of catch.

To ensure that the sportfishing targets will not be exceeded, the Department will need supplementary and more flexible controls. For reasons I have alluded to already in this chapter, sport fishermen should be involved in designing these regulations. I therefore recommend—

10. **The Department should invite the Sport Fish Advisory Board to assist in designing sportfishing regulations to ensure that the proposed targets for the sport catch will not be exceeded.**

These consultations should concentrate on sportfishing regulations of the kind described in the preceding section as well as other means of managing the sport fishery to meet the objectives.

To complement these restraints on the sport fishery, the Department should intensify efforts to reduce the commercial fisheries' catch of the vulnerable chinook and coho stocks. These efforts have already begun with elimination of terminal gillnet fisheries in many areas, including the Fraser estuary; reduction of the permitted depth of seine nets to conserve the deep-swimming chinooks; bunt requirements to allow young fish to escape seine nets; restriction of many Indian bands fishing for chinooks; exclusion of much of the troll fleet from the Strait of Georgia; and barbless hook requirements, and increased area and time closures for trollers. In view of the urgent concern for conservation of coho and chinook stocks in the Strait of Georgia especially, and until better information is available about how these stocks are fished, the catches in all fisheries should be tightly constrained.

We must recognize the possibility that the consultative process will not succeed in designing controls that will meet the regulatory objectives or that, for unpredictable reasons, agreed regulations will fail. In either event, the Department should have recourse in other means to control the catch. Thus—

11. **In the event that regulations designed in consultation with the Sport Fish Advisory Board are insufficient to constrain catches to the target levels in any year, the Department should close the sport fishery in either the Strait of Georgia or the rest of the coast to ensure that the targets are not exceeded.**

A general closure on sportfishing, either coastwide or in the Strait of Georgia, should be invoked only as a last resort. This is unquestionably a crude method of regulating the sport fishery; it causes serious dislocation for those whose livelihoods depend on sportfishing, and it abruptly eliminates sportfishing opportunities. It should be invoked only to ensure that targets will be met for the proposed five-year program. Beyond this period larger sportfishing stocks and more discriminating management and regulations should make such action unnecessary. By then, the proposed system of licences, punchcards and tags, coupled with intensive data collection, will provide a solid foundation for determining the levels of sportfishing activity and catches, the demand for sportfishing and the impact of regulations.

IMPROVING INFORMATION ON THE SPORT FISHERY

I cannot overemphasize the importance of reliable and comprehensive data on sportfishing for purposes of managing salmon stocks; managers cannot continue to rely on extrapolations from estimates in which they have limited confidence, such as those I have referred to in this chapter. In my Preliminary Report I expressed the hope that studies then nearing completion would identify the sportfishing effort and salmon catch with much more precision. Unfortunately, they have not done so.

The controversy and confusion surrounding the statistics on the sport catch has generated a great deal of skepticism among sport fishermen.

> We find it hard to believe that early last February DFO could announce it had a problem and the solution to that problem. Incredibly, nine months later they cannot produce what we could consider the minimum data needed to identify the scope of the problem and possible solutions.[25]

This skepticism has created a climate in which the Department has difficulty obtaining the support and cooperation essential for effective regulation. Yet management of the sport fishery, in contrast to the commercial fishery, depends heavily on voluntary information. Therefore, we must have a data collection system that meets not only the technical requirements of the Department, but also generates the confidence of sport fishermen in the information and in the regulations it supports.

> One of the things you have to build into your data system is the confidence of the people who are going to be affected by it.[26]

To this end, I recommend an immediate commitment to a comprehensive sportfishing information program to support sportfishing management and policy development:

12. The Department should immediately begin to develop a comprehensive data and information system for the sport fishery.

The Department recognizes its present data deficiency, and in its brief to this Commission expressed the hope that the Tidal Diary Program could be combined with the Creel Survey in a "comprehensive sport catch data system."[27] But the information must be collected and compiled consistently from year to year so that problems can be identified and corrected, and so that users of the information can have confidence in it.

The State of Washington's tidal water sport fishery is strikingly similar to British Columbia's in terms of size, structure, supporting species of fish and recent trends in fishing. And the State Department of Fisheries has developed a sportfishing information system using punchcards and creel surveys that illustrates the intent of the above recommendation as well as the value of sound data. The current annual cost is about $500 thousand (Canadian) and 14 person years. A consistent information program operating for more than a decade has apparently generated a good deal of confidence in the data and the management prescriptions that follow from them. As a result, Washington's fishery managers have recently introduced a host of new regulations and restrictions on sport fishermen in an attempt to protect declining stocks of chinook and coho salmon. This has been done without the vexatious disputes about statistics that dissipate so much energy and goodwill in Canada.

My review of the State of Washington's experience and other information leads to further conclusions about the needed data collection program:

13. A central component of the information system should be an intensive and continuous creel survey.

The creel census involving intensive angler enumeration and interviews at marinas, boat ramps and other landing points, coupled with boat counts from overflight surveys should include the whole coast as well as salmon taken in freshwater streams and rivers. Sport catch and effort estimates should be made on a month and statistical area basis.

Supplementary information should be obtained from surveys of licence holders, returns of punchcards or samples such as those obtained through the Tidal Diary Program.

Quick and continuous compilation and analysis of data collected during the fishing season is needed to effectively integrate the sport fishery with the in-season management system I proposed in Chapter 4. This will be particularly important for monitoring catches in relation to the sportfishing catch targets I have proposed. Thus, I recommend —

14. The Department should develop a rapid data processing system designed to integrate sportfishing information into general salmon management planning.

The objectives of fishing policy can be met only when we understand the values generated by fishing and how the sport fishery responds to such things as fish abundance and regulatory controls. Such information is scarce, and this is a serious impediment to a systematic approach to the allocation of catches. I therefore recommend that —

15. The Department should sponsor research on the value of sportfishing opportunities on the Pacific coast and what effect regulations have on those values.

This sportfishing information program should be started without delay. It will take time to develop the system, to compile sufficient, consistent information to support useful analysis, and to generate the confidence of the sportfishing community. But once in place, it will soon provide the information needed to guide the development of a more sophisticated and beneficial sportfishing policy than I am able to propose now.

LONG-TERM DIRECTIONS

With sufficient restraint in the short term to allow for rehabilitation of overfished stocks, the outlook for sportfishing opportunities in the longer term is bright. If enhancement efforts are successful, the outlook is even brighter. But present resource management practices and approaches to regulating the sport fishery are clearly inadequate to ensure that these opportunities will be realized.

In this chapter I have concentrated on the salmon sport fishery, which dominates recreational fishing on the Pacific coast, but parallel values and opportunities are also provided by other fish and shellfish. I have emphasized the importance of understanding the essential value of sportfishing, and how this value is affected by regulations. In the longer term, if we succeed in improving resource management and increasing the available catch, and if we put in place a system capable of effectively regulating fishing, there is little doubt that recreational values can be increased substantially by providing more, and a broader diversity of, sportfishing opportunities.

Hitherto, most tidal water sportfishing regulations have applied uniformly over the whole coast in spite of widely varying stock conditions and sportfishing pressures. Within the last couple of years, however, modest steps have been taken toward special regulations for particular areas of the coast and particular rivers. As information and administrative capabilities permit, future policy should aim at more diverse, discriminating regional arrangements adapted to local stock conditions and sportfishing demand. A broader range of sportfishing opportunities can also be provided through trophy areas, special fisheries on hatchery stocks, varying bag limits and so on.

Sportfishing policy must be progressive, adapting to changing circumstances and demands. To promote this evolution, the Department must have the advice of sport fishermen and involve them in designing regulatory arrangements. This must be a continuing process, supported by reliable information. In Chapter 17 I propose new consultative arrangements to facilitate this process.

FOOTNOTES

1. The Sidney Angler's Association, Exhibit #118, p. 11.

2. Department of Fisheries and Oceans, Exhibit #172, p. 1.

3. W.D. Masse, "Questions and Answers on the New Sportfishing Regulations." Prepared for the Department of Fisheries and Oceans, 1981.

4. M. MacGregor, "The Tidal Sportfishing Diary Program Report on the Pilot Years 1979-80." Prepared for the Department of Fisheries and Oceans, 1982. p. 33.

5. MacGregor, "The Tidal Sportfishing Diary Program." p. 33.

6. William F. Sinclair, The British Columbia Sport Fishermen. Department of the Environment, Fisheries Service, Vancouver, 1972.

7. Mary C. Harrison, Resident Boating in the Strait of Georgia, 1979 Update. Fisheries and Marine Service Manuscript Report #1538, Vancouver, 1979.

8. A.L.W. Tuomi, "The Role and Place of Sportfishing in Water-Based Recreation." Prepared for the 35th Annual Canadian Water Resources Conference, Ontario, 1982.

9. Harrison, Resident Boating in the Strait of Georgia. p. 6.

10. Tuomi, "The Role and Place of Sportfishing in Water-Based Recreation."

11. A recent national survey estimated expenditures in British Columbia directly related to sportfishing in tidal waters at about $89 million in 1980. See "1980 Survey of Sportfishing in Canada, Preliminary Results." Prepared for the Department of Fisheries and Oceans, 1981. This estimate is roughly consistent with a consultant's estimate of $95 million for 1981. See Edwin, Reid and Associates Ltd., Employment and Income Directly Associated with Sportfishing in B.C. Department of Fisheries and Oceans, Vancouver, 1981. But even this estimate may be conservative because some of the expenditures in the consultant's study were based on 1976 data without adjustment for inflation. See Sport Fishing Institute of British Columbia, Exhibit #97, p. 30.

12. The study by Edwin, Reid and Associates (see footnote 11) reported total sales of about $2 million by the five major manufacturers included in this survey. The manufacturers estimate that total sales by tackle producers in British Columbia are $10 to $15 million annually. See Tackle Manufacturers of Southern Vancouver Island, Exhibit #115, p. 2.

13. Press Release. Minister of Fisheries and Oceans, Vancouver, April 23, 1982.

14. Exhibit #172, p. 4.

15. Amalgamated Conservation Society, Exhibit #174, p. 3.

16. W.D. Masse and K. Peterson, Evaluation of Incremental Recreational Benefits from Salmonid Enhancement. Department of Fisheries and Oceans, Vancouver, 1979.

17. Exhibit #118, p. 7.

18. Exhibit #115, p. 11.

19. Tuomi, "The Role and Place of Sportfishing in Water-based Recreation." p. 11.

20. Victoria Charterboat Association, Exhibit #175, p. 1.

21. W.D. Masse, "Canadian Resident Charter Boat Licensing: A Background Paper." Prepared for the Department of Fisheries and Oceans, 1980.

22. P. Loftus, "Sportfishing Charter Licensing Proposal." Prepared for the Department of Fisheries and Oceans, 1981. p. 2.

23. P. Loftus, "Charterboat and Guide Identification and Monitoring Program." Prepared for the Department of Fisheries and Oceans, December 1981. p. 1.

24. Sport Fishing Institute of British Columbia, Exhibit #180, p. 10.

25. B.C. Wildlife Federation, Exhibit #173, p. 40.

26. Howard English, B.C. Wildlife Federation, transcripts of the public hearings, Volume 58A, p. 11898. As this report is being written, the Department is planning a workshop to review the sportfishing data programs in the states of Washington and Michigan and methods of improving the information system for Canada's Pacific coast sport fishery.

27. Exhibit #172, p. 12.

Part V

Policy Mechanisms

CHAPTER 16

ENFORCEMENT

The credibility of the Department is at stake if it is generally perceived that we cannot or will not protect the resource. Non-enforcement breeds lawlessness and penalizes the lawful. The resultant breakdown in law and order makes the job of stock management extremely difficult as disrespect for the law quickly transfers into disrespect for the regulators.

DEPARTMENT OF FISHERIES AND OCEANS[1]

Enforcement of the Fisheries Act and regulations cuts across most aspects of fisheries policy. All other arrangements for protection and management will be futile unless users and others whose activities threaten fisheries resources are effectively regulated.

Participants at the Commission's hearings repeatedly expressed serious misgivings about the Department of Fisheries and Oceans' performance in enforcing the laws and regulations it administers. They referred to the Department's tolerance of blatant violations, lack of support for the enforcement effort and inadequate training of fishery officers. One participant concluded that "enforcement is looked on as a poor relative, maintained at, or just above, the poverty level. A necessary evil that is to be tolerated at best."[2] Submissions at my public hearings and the Commission's review of the Department's policies and procedures have persuaded me that the enforcement program has been suffering from severe neglect.

This chapter examines the enforcement practices and capabilities of the Department and the courts, and recommends means to improve their effectiveness. Other chapters deal with enforcement issues as they arise in relation to specific fisheries and other activities. This chapter focuses on enforcement generally.

ENFORCEMENT OBJECTIVES AND CHALLENGES

Penal legislation can be designed to accomplish one or more of several aims: to punish those who perform a forbidden activity; to satisfy society's desire for retribution against, or denunciation of, offenders; to rehabilitate the offender; and to deter potential offenders from performing the illegal activity in the future. For fisheries, where the Department's first responsibility is to conserve the resource, I have concluded that the most important objective of the enforcement effort must be deterrence.

Enforcement may be broken into two broad categories: one is detecting and apprehending offenders; the other is prosecuting offenders and assigning penalties. An effective deterrent requires potential offenders to perceive that action from both categories will be certain and severe if they break the law. Detecting and apprehending offenders is futile if the penalty that results fails to counterbalance the rewards of the illegal activity. Similarily, enacting severe penalties is futile if the risk of detection and apprehension is minimal.

In the Pacific region, the dimensions of the Department's regulatory responsibilities are vast. Regulating commercial fisheries involves such things as vessel licensing, restrictions on gear, the manipulation of open and closed areas and of fishing times, and fish quality standards. The Department is faced with ensuring that these often technical and complex provisions are complied with by thousands of commercial fishermen. Regulating the sport fishery involves ensuring that bag and size limits, gear restrictions, licensing requirements and area closures are complied with by over 300 thousand anglers. Regulating the Indian fishery calls for, among other things, enforcing limits on fishing times and preventing the illegal sale of fish. The Department's responsibilities also include protecting fish habitat in the face of large scale development of other resources in the Pacific region.

The task of rigorously enforcing these laws is complicated by a number of factors. First, the area policed is enormous. The Pacific region covers all of British Columbia and Yukon, as well as the Pacific Ocean to 200 miles offshore. The coastline and rivers of British Columbia present literally thousands of points for clandestine fish landings and other illegal activities; and potential offenders can use small and highly mobile vessels and vehicles. The difficulties of creating a sufficiently visible enforcement effort over such a wide area are obvious.

Second, the economic incentive to fish illegally has risen dramatically in recent years. For example, recent estimates indicate that one day's illegal fishing can yield up to $800 for a commercial troller or gillnetter and up to $10 thousand for a seiner. For herring fishermen the rewards may be three times as high.[3] This pattern of potentially high rewards is repeated for other commercial fisheries, such as halibut longliners and trawlers, and for unlicensed poachers of abalone and salmon. In addition to commercial fishery offences, other areas of illegal fishing present strong economic incentives. Illegal fixed gillnets in rivers can produce in a single day a yield of over $500, while the cost of the net varies from only $30 to $100. If enforcement efforts are to be effective, penalties must be high enough to counteract the financial rewards of such illegal fishing activity.

Third, the expanded fishing power places extra pressures on the Department's enforcement staff. To counter the excess capacity that has plagued commercial fleets, the Department has reacted with tighter and tighter restrictions on fishing effort. This requires greater and greater enforcement effort, particularly since the financial incentive to resort to illegal activities is strong.

Fourth, fish habitat is threatened by the increasing size, variety and dispersal of industrial operations, whose illegal activities are often difficult to detect. These enterprises, too, have strong financial incentives to violate the law.

Finally, the Fisheries Act and the myriad regulations that have emanated from it during the century since its inception present a complex and unwieldy basis for enforcement. The difficulty that fishermen, fishery officers and the courts have in interpreting and applying the legislation further undermines the enforcement effort.

All of these factors make it difficult for any enforcement effort to create a deterrent effect sufficient to combat the financial lure of illegal fishing and other unlawful activities.

If, in addition, the Department fails to recognize these problems and to meet them with strong and highly visible enforcement strategies, the likelihood of illegal activities rises. Thus, the Department must assign a high priority to enforcement if it is to achieve the primary aim of protection and management of the resource.

ENFORCEMENT PROCEDURES

The procedures followed to enforce the Fisheries Act and regulations are common to most punitive legislation. Offences may be detected by fishery officers or by other law enforcement officers who, under normal circumstances, decide whether or not the infraction is serious enough to warrant a charge. Offences observed and reported by members of the public may also result in charges.

If a charge is laid, the accused is required to appear in court and plead either guilty or not guilty. Where a plea of not guilty is entered, a lawyer representing the Department is required to try the accused, produce evidence in court and satisfy the judge, beyond a reasonable doubt, that the accused committed the offence. If he is unable to, the accused is acquitted. But if the accused pleads guilty, or if the judge convicts him on the basis of the evidence, the judge sets a penalty, which is specified, to some degree at least, in the Fisheries Act. For most offences the judge has a broad range of discretion to levy a fine up to some maximum level, depending on the nature of the offence. When a fine is levied, the offence is entered in the criminal record of the offender.

Alternatively, the judge may choose one of three other remedies. He may release the offender without penalty or a criminal record by granting him an absolute discharge. He may give the offender a conditional discharge and put him on probation only; if the offender completes the probation period successfully he will have no criminal record and no fine. Or else the judge may give him a suspended sentence and place him on probation. The offender will have a criminal record, but if he completes the probation successfully he faces no further consequences. If he breaches probation, he may be brought back before the sentencing judge, who may impose a more serious penalty.

The court rules followed for most offences under the Fisheries Act are characterized as summary conviction procedures. These are always tried before a provincial court judge and, in sentencing an accused on conviction, the judge may not impose a fine that is higher than a maximum set out under the Act. Under sections 31(3) (habitat protection) and 38 (obstructing a fishery officer), the Crown prosecutor may elect to "proceed by way of indictment" instead of trying the case according to the usual summary conviction procedures. This has two effects: the accused may be tried before a superior court if he wishes; and, if he is convicted, the judge may impose a higher fine than is stipulated in the legislation for summary convictions. By electing this procedure, the Crown incidentally alerts the judge to the seriousness with which the Crown views the offence and this, in itself, can prompt him to impose stiffer penalties.

This, then, is the procedural framework within which the Fisheries Act and regulations are enforced. In the rest of this chapter, the issues will be explored and recommendations advanced in three broad areas that correspond to this framework: detection and apprehension of offenders, prosecution in the courts, and penalties.

DETECTION AND APPREHENSION

The performance of the Department of Fisheries and Oceans in detecting and apprehending offenders is difficult to assess. The incidence of violations under the Fisheries Act and regulations and their associated costs cannot be determined accurately because not all of them are observed and reported.[4]

As a result, my proposals in this area are confined to the organization of the enforcement effort and associated policy features. The appropriate intensity of policing in the field is best left to the Department to decide in light of the incidence of crime perceived in various parts of the region.

Levels of Activity

Table 16-1 depicts the charges laid over the past seven years and their results. The numbers of charges rose sharply in 1978 and 1979 and has declined slightly since then. These figures are not firm evidence of trends in illegal activity, however, because they may be explained by variations in the intensity of the enforcement effort from year to year. Indeed, the inception of a special R.C.M.P. training course for fishery officers in 1977 (described below) alone might explain the subsequent surge in charges laid.

Table 16-1 Prosecutions and convictions

Pacific Region
1975-1981

year	charges	convictions	acquittals	stayed	outstanding
1975	603	521	36	46	0
1976	887	776	42	69	0
1977	753	583	82	88	0
1978	1050	683	89	130	148
1979	1293	756	75	154	308
1980	1082	575	54	107	346
1981	1014	492	47	140	335

Source: Department of Fisheries and Oceans.

Table 16-2 lists the number of charges laid in 1981 by category of offence. Over 60 percent were laid under three categories: sportfishing, shellfish fisheries and general. Tidal sportfishing violations include exceeding bag and possession limits, and violating size limits. Offences under the shellfish regulations include size and bag limits of oysters, crabs and other invertebrates. The general regulations prohibit such things as fishing in closed areas, during closed seasons for certain species, and illegal fishing in rivers and at sea. They also prohibit Indians from fishing without permits or in contravention of their time, area or gear conditions. The Indian fishery regulations are confined to the illegal sale of fish by Indians and purchase by non-Indians.

Table 16-2 Charges laid under the Fisheries Act and regulations in the Pacific Region in 1981

offence	number	percent
Fisheries Act		
habitat	34	3
other[a]	35	4
Regulations		
general	303	30
shellfish	194	19
tidal sportfishing	129	13
commercial salmon	84	8
nontidal sportfishing	73	7
commercial licensing	60	6
commercial herring	34	3
Indian fisheries	33	3
other	35	4
total	1014	100

[a] Primarily, possession of fish in closed areas (Fisheries Act, section 19).

Source: Department of Fisheries and Oceans.

Public Involvement in Enforcement

While primary responsibility for fisheries enforcement is shouldered by the Department, field staff receive support from the public under the Observe, Record and Report Program and through bounty arrangements.

Observe, Record and Report Program In June of 1979 an Observe, Record and Report Program, sponsored jointly by the B.C. Wildlife Federation, the Department of Fisheries and Oceans and the provincial Fish and Wildlife Branch, was developed to encourage the public at large to report violations by telephoning a toll-free number. In 1980, this number was manned 24 hours a day, seven days a week.

The B.C. Wildlife Federation provided the initial impetus to set up the program and to keep it functioning. The province provided a public education element, consisting of a slide-tape show to inform the public of the program and to explain how to report infractions. Since the first year of operation it has fallen to the Department of Fisheries and Oceans alone to provide the funding required to maintain the program, including the manning of the toll-free number to which infractions are reported.

When the service was initiated, the complaints received were approximately evenly divided between the Department of Fisheries and Oceans and the provincial Fish and Wildlife Service. During 1980, when the toll-free number was maintained around the clock, 61 percent of the calls received were referred to the Department of Fisheries and Oceans, 36 percent to the Fish and Wildlife Branch, and 3 percent to other organizations.

Table 16-3 Observe, Record and Report Program

Incident Reports
1980

	number	percent
weekdays		
8:00 a.m. to 4:00 p.m.	185	40
other hours	123	27
weekends and holidays	152	33
total	460	100

Source: Department of Fisheries and Oceans.

Early in 1981, the hours of operation were curtailed to Monday to Friday from 8:00 a.m. to midnight. Table 16-3 indicates that, by eliminating manning on the Zenith number over weekends and holidays and evenings, it misses over one-half of potential callers. Therefore, I make the following recommendation:

1. **To encourage and facilitate reporting of violations by the general public, the Observe, Record and Report Program should be expanded with appropriate publicity, to seven days a week, eight a.m. to midnight daily.**

With a 24-hour radio service in place to support the fishery enforcement officers (recommended below) there should be no need for specialized telephone operators to take these calls, and the program could be expanded to 24 hours a day. Radio operators could take them, or at least those during the afternoon and graveyard shifts.

Bounties Under a long-standing federal regulation, when information from a nongovernmental informant leads to successful prosecution and conviction under the Fisheries Act or regulations, the informant is entitled to half of the proceeds from any penalty or forfeiture arising.[5] The Department has not publicized this regulation widely, perhaps because they fear that publicity would encourage over-zealous citizens to abuse the legislation; but since a bounty is paid only upon a conviction, fears of this nature are unfounded. This is a useful tool, and therefore should be retained.

2. **Bounties for fisheries prosecutions should be retained and the public should be encouraged to report violations.**

Voluntary Compliance

Under current policy, the Department of Fisheries and Oceans relies heavily on what it calls "credible voluntary deterrence" as a vehicle for enforcement:

> The policy of the Department is to effectively protect fisheries resources in line with national and regional conservation requirements. Present policy calls for the controlling features of the management plan to be developed in cooperation with the fisherman/user ... whenever practical. In this way a set of credible voluntary deterrences will be the first line of control. When ignored or when these deterrences fail to produce the desired results, the plan will of necessity fall back on statutory controls. The application of these controls becomes the responsibility of the department through its enforcement staff.[6]

The Department's reliance on this vehicle to fulfill its enforcement mandate is misplaced, overly optimistic and premature. It will work only among individuals who are predisposed to obey the law, whether through fear of punishment, social pressure, or moral obligation. At this time, none of these conditions prevail. The enforcement effort mounted by the Department is insufficient to produce any significant fear of punishment. And many fishermen do not consider illegal fishing activity to be wrong, partly because they believe fish are cheap and plentiful. So they feel no moral obligation to obey the law nor are they responsive to public pressure. Accordingly, I have concluded that heavy reliance on voluntary compliance is misplaced.

3. **The Department should abandon its vague and inappropriate credible voluntary deterrence policy as its primary aim in enforcement and replace it with a vigorous and well-organized enforcement capability in line with the recommendations made below.**

Enforcement Personnel and Organization

One hundred and twenty-five fishery officers, posted throughout British Columbia and Yukon, are responsible for the day-to-day enforcement activities in their areas. Since 1977, many of these officials have received one month of special enforcement training at the R.C.M.P. Training Academy in Regina. In addition, 19 inspection field officers are concerned with enforcing fish processing standards as described in Chapter 13. Up to 50 patrolmen and fish guardians are hired each season, and 150 ship's officers and crew are employed as support staff for enforcement at sea and in rivers and estuaries near the coast.

Fishery officers are accountable to their respective district supervisors, and each of the 10 supervisors is in turn accountable to one of the 3 area managers. These area managers report to the Director of the Field Services Branch in Vancouver headquarters.

Enforcement personnel at Vancouver headquarters provide support services to fishery officers and others who are concerned with enforcement activities, but they have no direct responsibility for, or control over, enforcement in the field. They include a chief of field services systems, a staff officer in fisheries regulations, a chief enforcement officer, an intelligence officer and a court liaison officer. A ticketing offences coordinating officer may join them in the near future. This unit is responsible to the Chief of the Management Services Division, who in turn reports to the Director of the Field Services Branch. Thus, the director provides the formal organizational link between headquarters enforcement personnel and field staff.

In Ottawa, a National Director of Enforcement was appointed in 1979, whose main role is to assess regional enforcement activities with a view to developing national policies for use in the regions. His responsibilities also include developing fishery officers' career paths and opportunities for promotion within the Department.

Until March 1981, when it was disbanded, the enforcement effort in the Pacific region was supported by a General Investigation Unit. It was established in 1975 in response to the need for specialized enforcement staff to carry out detailed investigations of complicated violations in all divisions. The unit expanded to six members in 1979 and investigated such matters as the illegal transport of fish out of British Columbia, the illegal sales of fish locally, the illegal market in herring and salmon roe, and the illegal sale of fish caught by sport fishermen and river poachers. Their investigations resulted in a number of successful prosecutions against some of the more sophisticated offenders in these fisheries. The group was disbanded in 1981 on the grounds that its expense could not be justified in the face of more demanding financial priorities. There were also some concerns within the Department about the safety of the members of the units while they were engaged in covert investigations and the lack of cooperation from local field officers.

In its absence, the Department calls on the R.C.M.P. and other police forces when fisheries personnel encounter circumstances that could lead to serious confrontation. However, this is not entirely satisfactory since the availability of local police varies according to their priorities and other demands on their time, and because most are understandably unfamiliar with the intricacies of fisheries law.

Thus, the Department depends primarily on the 125 fishery officers as their front line enforcers, but this approach suffers from serious shortcomings. Because the fishery officers have other demands on their time, they frequently have to use a firefighting approach to enforcement, responding to emergency situations as they arise. In addition, some officers put a low priority on enforcement. A recent study indicated that only 19 percent of the fishery officers in this region saw themselves primarily as enforcement officers; and almost 50 percent saw themselves as resource managers.[7] This might account for almost 25 percent of fishery officers in the Pacific region laying no charges at all under the Act or regulations in 1979.

There are a number of explanations for the reluctance of so many fishery officers to carry out enforcement duties, even though enforcement is such an important part of protection of the resource. First, most are primarily resource managers by training and by inclination. Enforcement to them is viewed as distasteful and sometimes hazardous work that interferes with their management and conservation activities. It is essentially police work requiring specialized training and knowledge of the complexities of the law to be administered, and willingness to get involved in investigations, interrogations and, occasionally, potentially dangerous situations. For those with a resource management orientation all of these activities are unfamiliar and often unpleasant. It may also generate ill will toward them in the communities in which they work and live. Since individual fishery officers themselves are apparently left to determine their own priorities between enforcement and management functions, it is enforcement that often suffers.

Second, headquarters apparently does not require fishery officers to emphasize their enforcement functions. According to testimony at the Commission's hearings, reluctance to perform them has never led to the dismissal of an officer. Even when charges are laid, they often take years to proceed through court; almost a quarter of the charges laid in 1979 are still in limbo. The reasons for these long delays are unclear, but one possible explanation is that fishery officers who lay charges are not required to adequately follow them up.

These considerations have led me to conclude that the Department is operating under a serious misconception in implementing its enforcement policy. It assumes that, because resource management and enforcement share the same goal of resource protection, the management of the resource and the regulation of its users require the same kinds of specialized knowledge and skills. In fact, enforcement demands entirely different sorts of knowledge and skills from resource management. If the enforcement efforts of the Department are to be effective, the organization of the Pacific region must reflect this distinction by allocating the responsibilities for these two functions to different groups.

The idea of separating management and enforcement functions of conservation officers is not new. The Director of the Alaskan Division of Fish and Wildlife Protection stated the issue as follows:

> Law enforcement is a full-time profession and wildlife law enforcement even to a greater degree because of the greatly diminished public participation in reporting and the unusual and remote locations where violations occur. Effective enforcement requires planning, it requires a person selected for his sincere interest in enforcement as a profession not as a missionary to save animals or fish, not as a part-time officer and part-time biologist/manager. But a real honest to goodness employee that has a sincere desire to become professional within the entire justice system. He must be willing to assume the identity of a police officer as much as the name may bother some managers both physically, morally and philosophically. And he must leave behind the outdated philosophy that ade-

> quate compliance can be achieved because of enlightened self-interest growing out of a program of public information. A tolerable level of compliance can only be achieved when the community is fully aware that the prime goal of the local wildlife law enforcement officer is law enforcement. And they respect him and his mission, convinced that violators will be apprehended, that laws apply equally to all and that the system is creating a deterrent by removing the benefits from misuse of resources.... Certainly the officer's obligation to resources remains the first consideration and number one priority, but his training, his equipment and his attitude must reflect a law enforcement strategy.... People management and biological management of resources are not totally in harmony as each has its own peculiar need for competence and professionalism. That need can only be accomplished if neither is diluted to the point of inefficiency. A Departmental separation of both functions is the only means to secure a maximum benefit to resources.[8]

A study commissioned by the B.C. Ministry of Recreation and Conservation in 1977 also recommended that the management and enforcement functions of the departmental conservation officers be separated. I understand that these recommendations have been carried out with considerable success.

From time to time the Department itself has recognized the need for a specialized enforcement unit. In 1979, a study prepared for the Pacific region on a licensing and resource royalty program recognized the different specialties required of an investigating officer as opposed to a landings verification officer.[9] More recently, in 1982, a regional review of inshore patrol vessels in the Pacific region expressed the need for a special enforcement squadron to be established in each division for the purpose of providing a "high profile enforcement presence that has been lacking."[10] And at the Commission's hearings on enforcement, Departmental personnel indicated that, since 1979, the Department has recognized the need to separate management and enforcement functions to a limited extent in the roe-herring fishery.

However, despite this apparent support for a specialized enforcement unit, the recent disbandment of the General Investigation Unit suggests that enforcement is still relegated to a position of low priority by the Department. Given the aim of conserving the resource and the increasing threats made to the resource by illegal fishing activity, the Department must reassess its view that such specialized enforcement activity is a luxury.

What is needed is a well-equipped, highly trained, mobile team of fishery enforcement officers to supplement field staff. The mere presence of an aggressive, highly visible enforcement team on the fishing grounds would increase the perceived risk associated with illegal activity and would thus have a significant deterrent effect.

My recommendations are geared to this need. In designing them I have considered the specialized needs of the fisheries resource, training and equipment requirements, the vast area to be policed, the inevitable budget and manpower constraints faced by the Department and implications for administration. The range of alternatives put forward and discussed at the Commission's hearings covered a number of possible combinations of these factors. The following recommendations are an attempt to incorporate the best aspects of each.

4. **In the Pacific region a special enforcement unit should be created whose *exclusive* responsibilities will be enforcement. Their duties should *not* include resource management.**

The unit should be primarily responsible for enforcing the Fisheries Act and all regulations except those relating to fish quality, processing plants and vessel sanitary standards, which should continue to be enforced by the Inspection Division.

Members of the unit should receive rigorous training in all relevant enforcement techniques in the context of the special needs of the fisheries resource. The current training arrangements with the R.C.M.P. should be expanded or else arrangements made with the B.C. Justice Institute in Vancouver, which now trains provincial conservation officers. Enforcement skills of members should be updated regularly through refresher courses. With special training and supervision, a revamped enforcement capability should be able to handle most, if not all, offences.

Members of the special enforcement unit should wear uniforms to engender a professional image. Side arms should be available to them, to be worn when their safety or that of others is threatened. And they should be properly equipped with vehicles and have access to well-equipped vessels for patrols at sea and in the estuaries and rivers. They should be linked to headquarters and field offices 24 hours a day by short-wave radio services.

Fishery enforcement officers should be stationed in each of 10 districts in the Pacific region. The number to be assigned to each district will vary by district, depending on local needs. To the extent that they are qualified and have a keen interest in enforcement, fishery officers now employed in the region should be posted to the enforcement unit. If necessary, these personnel should be supplemented by others hired from outside the Department. The remaining fishery officers should be assigned to resource management positions. However, they should retain legal status as fishery officers to enable them to deal with infractions they observe incidentally in the field, and they should be encouraged to do so. During particularly hectic fishing seasons, management officers should play an active role in enforcement activities to supplement fishery enforcement officers.

The transition from the existing organizational framework for fishery officers to the creation of a specialized enforcement unit in the region should be undertaken gradually, district by district, to minimize disruption of staff and to dovetail with the redefined management responsibilities of fishery officers.

In order to ensure that high-calibre personnel are recruited and trained and that uniform policy procedures and techniques are applied in the field, the enforcement unit should have a reporting line that is independent of resource management in the field:

5. **At Pacific region headquarters in Vancouver, a senior enforcement officer and support staff should be appointed and placed directly in charge of all fishery enforcement officers. The enforcement officers should be responsible directly to headquarters, rather than through area managers as they are now.**

When the enforcement unit is working smoothly, consideration should be given to shifting the reporting line of enforcement officers through area managers, in line with the trend toward greater decentralization in the Pacific region.

6. **If the need arises, a special task group operating from headquarters should be created, along the lines of the disbanded General Investigation Unit, to supplement district enforcement officers during hectic periods and to investigate complex crimes when necessary.**

If in future the field enforcement officers report to area managers under a decentralized organizational framework, the special task group should work in close cooperation with area managers.

Legislative reform should be undertaken to clarify the status of enforcement officers and to facilitate convictions. Currently, fishery officers are included in the definition of peace officer under the Criminal Code of Canada and have their powers. But the Fisheries Act does not refer directly to this designation and in fact mentions only that fishery guardians have the powers of a "police constable," a meaningless designation. Further, the Act provides a separate offence for obstructing a fishery officer, even though the Criminal Code includes a parallel provision. I therefore make the following recommendations:

7. **The Fisheries Act should clearly confer peace officer status on enforcement officers, other fishery officers and fishery guardians.**

8. **The provisions of the Fisheries Act that deal with obstructing fishery officers should be eliminated or redrawn to conform with the powers and rights they have under the Criminal Code as peace officers.**

Under current policy, fishery officers must identify the person in charge of a vessel fishing illegally and this requires boarding. Frequently, it is impossible for officers to follow these procedures, when, for example, many vessels are fishing illegally, when seas are rough, or when such vessels are spotted from the air. The following recommendation should meet these shortcomings.

9. **The owner or registered charterer of a vessel should be made liable to prosecution for any illegal fishing activities carried out by the vessel regardless of whether or not he is actually on board when the offence is committed, unless he is able to prove that the skipper of the vessel was in control without his consent.**

This expanded concept of owner liability for an illegal activity has worked satisfactorily with regard to certain provincial motor vehicle offences such as hit and run;[11] and there are three advantages to such a scheme for fisheries. First, it would permit a larger number of offenders to be detected by removing the need to board and identify the crew of each one. Second, it would eliminate the need to prove the identity of the individuals in court months after the event. Third, it should encourage owners to participate in the enforcement effort to a greater extent by providing them with an incentive to police their skippers and crews.

PROSECUTION AND THE COURTS

While detection and apprehension are the essential first steps in any enforcement program, they must be followed by strong action in the courts if the deterrent effect is to be maintained. Although 75 percent of the charges laid under the Fisheries Act or regulations result in convictions (see Table 16-2), this apparently high rate of success is misleading: since penalties are low, many offenders plead guilty. The high success rate could also indicate that charges are laid only when prospects of success are high. As I show below, both the quality of prosecutorial services available to the Department of Fisheries and Oceans and the attitude of the judiciary toward fisheries offences need to be markedly improved.

Crown Prosecutors

Prosecutions under the Fisheries Act and regulations are the responsibility of the federal Department of Justice. For most prosecutions the Department of Justice engages lawyers in private practice in the locality where the trial is to be held.

Names of private practitioners who are available to prosecute fisheries offences are supplied by the Department of Justice, apparently without regard to whether the lawyers have experience in prosecuting in that field. The Department of Fisheries and Oceans has no influence in the choice of names that appear on the list.

Department of Justice staff lawyers handle some prosecutions, particularly those in larger centres such as Vancouver. They also prosecute many offences against the habitat protection and deleterious substance provisions of the Fisheries Act elsewhere in the region.

The Department of Fisheries and Oceans carries out some informal training of prosecutors in the different regions by familiarizing them with vessels, fishing gear and so on. The Department also employs a court liaison officer for fisheries prosecutors, whose main activity is disseminating recent decisions and applicable law to fisheries prosecutors throughout the region.

The quality of fisheries prosecutions depends on the availability of lawyers who have a high level of legal skill and a specialized knowledge of the resource. Ideally, the prosecutor should be available to the investigators throughout an investigation to answer questions that might arise about the evidence required to lay a charge, whom to proceed against and the choice and wording of the charge. The same prosecutor should then be available to take the case to court and follow through until it has been disposed of.

However, the Department has had difficulty in obtaining and maintaining prosecutors with the necessary time and skills for two reasons. First, a change in government usually produces a change in the appointment of the private lawyers who are to perform fishery prosecutions. It is a regrettable fact of political life that the federal government typically appoints lawyers who are sympathetic to the party in power. Thus, the Department is often unable to retain lawyers that they know could do a good job in prosecuting a case because their names have been taken off the list supplied by the Department of Justice. They have pressed the issue with the Department of Justice, but with no success:

> The response is that you have to live with the system that's in place, and we've had no cooperation in getting the Department of Justice to push for us in terms of getting a lawyer that we know is competent in a certain field. While he may be outside of the political system in terms of appointment of Crown counsels, he may have been available a few years back under another government, but I know we've tried and haven't (had) any success.[12]

Second, lawyers in the Department of Justice who are assigned to fisheries cases are often young and relatively inexperienced counsel. As they gain more experience, many of them leave the Department to go into private practice. The result is that fisheries personnel, having expended time and effort in acquainting a prosecutor with the peculiar problems of the fishery resource, are often faced with having to start this training process all over again with a new prosecutor.

I recommend that the current arrangements be changed as follows:

10. The Department of Justice should designate a senior staff lawyer in its Vancouver regional office to oversee all prosecutions under the Fisheries Act.

He would be available for consultation and advice to fisheries investigating officers and prosecutors throughout the Pacific region, to take test cases to courts, to review appropriate cases for appeal and take them to appeal, to implement uniform practices throughout the region, to ease problems with evidence, and generally to increase the quality of fisheries prosecutions. He should also be available to assist the Pacific region in formulating and drafting regulations to shorten delays in enacting them, and to ensure that they will be enforceable in court. This individual would be better situated in the Department of Justice than as an internal Department of Fisheries and Oceans counsel, since his association with other Justice Department lawyers would keep him abreast of current developments in the law and give him a clear perspective of the way fisheries prosecutions fit into the administration of justice generally.

11. In consultation with the Department of Justice, the Department of Fisheries and Oceans should have the power to choose and appoint the lawyers who will act as prosecutors under the Fisheries Act and regulations.

This would allow the most experienced and competent practitioners to be appointed regardless of their political affiliation. The appointment of senior high profile lawyers to conduct fishery prosecutions would also provide a means of indicating to the courts the severity with which offences under the Act should be viewed.

12. The court liaison service should be maintained and if necessary expanded to ensure that all useful information about developments in fisheries law is disseminated throughout the province to enforcement officers and prosecutors, including statistical information for use in sentencing.

Private Prosecutions

Some citizens have recently instigated successful investigations and prosecutions under the habitat protection sections of the Fisheries Act. On two occasions, government laboratories have been used to test samples provided by interested citizens, and on both occasions the results led to successful prosecutions. In several other cases, citizens have laid private informations under the Act and either pursued them successfully themselves or convinced Department of Justice prosecutors to take over the prosecutions.

While the Department claims it is willing to cooperate with citizens having well-documented cases, some participants at the Commission's hearings stated that the reverse is true and that government laboratories do not accept samples for testing from citizens. Judging from the small number of cases citizens have been involved with thus far, it appears that, if the Department had fears of becoming an accomplice to strident vigilante groups, those fears are unfounded. Citizens have generally provided valuable information and assistance and should be encouraged to continue to do so.

13. The biological laboratories of the federal government in the Pacific region should accept and test properly collected samples presented by citizens, and the Department of Justice should be available to assist with legal proceedings.

The Courts

Virtually all prosecutions under the Fisheries Act and regulations take place in the Provincial Court of British Columbia. Because most cases heard in that court deal with charges laid under the Criminal Code, a provincial court judge may be inclined to treat a fisheries charge as relatively unimportant compared to the other criminal matters he regularly hears.

The judiciary must be fully educated about the threats facing the fishery resource as a result of illegal fishing activity and habitat destruction. The judiciary can be educated in two ways. First, effective Crown counsel can teach judges a great deal about the resource and the threats facing it by eliciting evidence from knowledgeable witnesses and making full submissions. Implementating the recommendations made earlier in this chapter concerning the appointment of knowledgeable prosecutors should assist here. Second, the judicial conferences held for the ongoing education of provincial court judges could be a medium for disseminating relevant information. Recently, a professor in environmental law presented a paper on the habitat protection sections of the Fisheries Act to a group of judges at such a conference.[13] This is an encouraging sign that the provincial court judges in British Columbia are becoming increasingly aware of their obligations to the fisheries resource and this trend should continue.

14. The education of the judiciary in fisheries law and policy should be encouraged through the appropriate channels of the provincial court system.

PENALTIES

The Fisheries Act, regulations and licences are enforced through fines, jail sentences, the seizure and forfeiture of illegally caught fish and equipment used to commit the offence, and the suspension and cancellation of fishing licences. To complement a more effective detection and apprehension capability and an improved prosecution process, these sanctions must serve as effective deterrents.

Fines

Table 16-5 sets out the pattern of penalties for various infractions under the Act. Most offences involving illegal activities are covered by the general penalty provision in section 61, which sets a maximum $5,000 fine but no minimum level. However, as Table 16-4 indicates, the levels of fines imposed by the courts have tended toward the lower end of this range. In the last four years more than 90 percent of convictions have resulted in fines of less than $500 or in no fines at all.

Table 16-4 Penalties imposed under the Fisheries Act

	1978		1979		1980		1981	
	number	percent	number	percent	number	percent	number	percent
suspended sentences, absolute and conditional discharges	62	10	64	9	69	12	22	5
fines of less than $100	352	54	402	54	255	45	229	49
fines of $100-$499	201	31	204	27	213	37	209	44
fines of more than $500	24	4	74	10	36	6	11	2
jail sentence	9	1	1	0	2	0	2	0
total	648	100	745	100	575	100	473	100

Source: Department of Fisheries and Oceans.

The current scheme of financial penalties under the Fisheries Act is replete with ambiguities, inconsistencies and anachronisms. For example—

i) Section 38 of the Act, which deals with the obstruction of fishery officers in the execution of their duties, stipulates a penalty on summary conviction of a fine of up to $100 or imprisonment of up to six months, incredibly, *with hard labour*. The latter has had no place in Canadian penal law for decades and, in any event, is completely misplaced as a penalty for an offence which merits a fine of only $100.

ii) The penalty for failing to remove obstructions from streams or provide a sufficient flow of water over a spillway after three days' notice defies comprehension. It states that an offender "is liable to a penalty of not less than $4.00 and not more than $20.00 for each day or part of a day during which such notice is not complied with is guilty of an offence and liable on summary conviction to a fine of not exceeding $5,000 for each day or part of a day during which such notice is not complied with" (sic). The ambiguity created by what is apparently a drafting error makes it impossible to ensure convictions under this section.

iii) Section 54, which deals with the use of rockets and explosives to hunt for or kill fish, exacts a fine of between $100 and $300, or imprisonment of not less than three months and not more than six months. This means that if a judge wanted to give an offender a heavier sentence than a $300 fine, he would have no option but to sentence him to at least three months in prison.

iv) Most fines for illegal fishing are imposed under section 61, which stipulates a maximum fine of $5,000. However, this general provision does not distinguish between illegal fishing with commercial gear, which could wipe out a fish stock (for example, "creek robbing"), from failure of a sport fisherman to meet the size limit on a crab.

Table 16-5 Penalties under the Fisheries Act

section	**infraction**	**maximum penalty**	
		first offence	**subsequent offences**
habitat and deleterious substance penalties			
31(3)	damaging fish habitat[a]	$ 5,000	$ 10,000
33(5)(a)	throwing deleterious substances overboard or depositing slash, stumps, etc. in streams[b]	$ 5,000	$ 10,000
33(5)(b)	depositing deleterious substances into water frequented by fish	$50,000	$100,000
33.4(1)(a), (b) and (c)	failing to provide information to the Minister about a work or undertaking that results in the deposit of a deleterious substance or damage to fish habitat, or failing to report the deposit of a deleterious substance	$ 5,000	$ 10,000
33.4(1)(d), (e) and (f)	carrying out such a work or undertaking contrary to information submitted to the Minister or contrary to any order of the Minister, failing to take reasonable measures to prevent or mitigate the deposit of a deleterious substance or to comply with an order specifying such action.	$25,000	$ 50,000
33.4(1)(g)	obstructing an inspector or providing false information to an inspector	$25,000	$ 50,000
other penalties			
38	interfering with fishery officer in execution of duty[a]	$100 or six months' imprisonment with hard labour	
50	failure of owners and managers of lobster factories or canneries to provide certain information to the Minister	at least $100, but not more than $400	
51(1)	fishing with an otter trawl without a licence	at least $100, but not more than $2000 and court costs	
52	refusal to provide fishways or diverters around an obstruction in a stream where required by the Minister	at least $4 but not more than $20 per day, and not more than $5000/day[c]	
54	using rockets or explosives to fish	at least $100 and court costs or 3 months' imprisonment, but not more than $500 and court costs or 6 months' imprisonment.	
55	failing to provide screens on water intakes	$5,000 per day	
56	damaging fish propagation facility or fishing there	at least $50, but not more than $200 and court costs; in default of payment, at least 6 months' but not more than 12 months' imprisonment; or both fine and imprisonment	
58(1)	using vessel or equipment contrary to Act or regulations	seizure of vessel, equipment or fish	
58(5)	conviction for any offence under the Act or regulations, where vessel, equipment or fish have been seized	forfeiture to the Crown of the vessel, equipment or fish, or of the proceeds of sale of them	
61(1)	contravening any provision of the Act or regulations, where specific penalty is not provided	$5,000 or 12 months' imprisonment or both	
63	fishery officer or guardian violating the Fisheries Act or regulations	at least $100 and court costs or 3 months' imprisonment, but not more than $500 and court costs or 6 months' imprisonment	

[a] On indictment, unlimited fine or two years' imprisonment.

[b] The courts have declared the offence prohibiting the deposit of slash, stumps, etc. to be beyond the power of Parliament, so this penalty is not available.

[c] There appears to be a drafting error in this section.

In addition to the difficulties presented by such obvious inconsistencies and ambiguities, numerous concerns were expressed at the Commission's hearings about the lack of any meaningful scale of financial penalties in view of the financial rewards of illegal fishing.

In a recent study, it was estimated that, if there is a 15 percent chance that a vessel will be boarded each month, the potential legal penalty (including fine, confiscation and lost fishing time) must be about ten times the value of potential gains from violations over a two-week fishing trip.[14]

Considerable support was expressed for simply raising the maximum level of fines that a judge may award for offences under the Act. However, the problem with raising the maximum alone is that judges might continue to award penalties in the lower ranges of the sentence. It appears that something more is required to ensure that sentencing will be severe enough to adequately deter offenders.

In view of these deficiences, I recommend that financial penalties for offences under the Fisheries Act and regulations be reformed, as follows:

15. **The penalty provisions in the Fisheries Act should be thoroughly reviewed to eliminate all anachronisms, inconsistencies and ambiguities.**
16. **For illegal fishing the Act should provide for a higher scale of fines. The maximum fine for commercial violators should be raised from $5,000 to $10,000.**
17. **For all offences that seriously threaten fisheries or habitat the Crown should be able to proceed by way of indictment instead of only summarily as is presently the case for most, and judges should be authorized to impose fines that are higher than the upper limits stipulated for summary convictions.**
18. **To discourage repeat violators, second and subsequent offences of all kinds should draw high mandatory minimum levels of fines, which should vary according to the kind of offence: commercial, sportfishing, pollution, habitat destruction, and so on.**
19. **Through its court liaison program and its prosecutors, the Department should systematically review all court decisions and report to the Department of Justice those where sentences are abnormally low and should be appealed to higher courts.**

Seizure and Forfeiture

Under the Fisheries Act, a fishery officer has the power to seize vessels, vehicles, gear or fish when he has reasonable grounds to believe they have been used in or obtained by an offence under the Act or regulations. Under these procedures, the government may hold the seized articles until they are ordered forfeited to the Crown or released to the accused. The Act provides for the return of these items before trial if the accused posts a bond in an amount ordered by the court. Normally, the Crown does not oppose these requests for a bond. If the owner of such items is convicted, the Minister or the convicting judge, in addition to any other penalty imposed, may order the items to be forfeited to the Crown. Forfeited property is normally sold, and the proceeds are paid into the public treasury.

Despite a Department policy directive in 1979 urging that seizure be seriously considered for all violations, the powers given under this section are not always exercised. In 1981, of all charges laid, seizures were made in about 70 percent of the cases; but for many, only illegally caught fish were seized and not the more valuable vessels and equipment. Forfeitures are limited to seized fish and sometimes to illegal nets or motor vehicles used to transport poached fish.

These powers provide one of the most effective weapons against illegal fishing, but they are effective only when vessels or equipment more valuable than the fish are seized. By seizing vessels or equipment on the fishing grounds, a fishery officer temporarily removes the offender's ability to pursue his livelihood, and provides a dramatic example to those who are tempted to break the law. Ultimate forfeiture has an even greater financial impact on the offender.

I therefore make the following recommendations:

20. **The Department should pursue an aggressive policy in seizing vessels and equipment when offenders are caught and charges are laid.**
21. **In flagrant cases, Crown counsel should oppose applications to court by the accused for the release of equipment pending trial. For others, where circumstances warrant, they should argue for substantial bonds, approximating the market value of the vessel and equipment under seizure.**
22. **Illegally caught fish and illegal equipment should be forfeited to the Crown, as at present.**

I see no need for the forfeiture of vessels or legal nets and equipment if the level of fines is increased, as I have recommended earlier.

Licence Suspension and Cancellation

The regulations under the Fisheries Act allow the Minister to cancel, suspend or refuse to re-issue a commercial licence when its holder has been convicted of illegal fishing. (Under the Act, the Minister may cancel a licence when a provision of the licence itself is violated. But in the Pacific region, at least, this authority is ineffectual because licences do not include terms and conditions regarding fishing activities.) The current Departmental practice is to recommend that the Minister suspend a licence only when a person is convicted of a third offence. Although the Department does not keep specific records of the use of this power, it is estimated that about half a dozen commercial licences have been suspended over the last five years. Evidently, none have been cancelled outright.

In Chapter 10 I recommended that individual quota licences be adopted for a wide range of commercial fisheries, including halibut, groundfish, food and bait herring and abalone. The keystone to successful implementation of these programs will be the systematic reporting and recording of the catch of individual fishermen, to ensure that they do not catch more than their quota and that the total allowable catch of a species is not exceeded. As well, a quota system will enjoy the confidence of fishermen only if all are assured that violators do not stand to profit from their excesses.

The suspension or cancellation of a licence removes the offender from the fishing grounds, whether he be engaged in the commercial, sport or Indian fishery. The fishing industry itself has advocated strongly and unanimously its support for licence suspension.

I am convinced that more vigorous use of this enforcement technique would act as a powerful deterrent to illegal fishing activities. Accordingly, I make the following recommendations:

23. **All categories of licences — commercial, sport and Indian — should be liable to suspension for a violation of the terms of the licence, the Fisheries Act or the regulations, upon the conviction of the licence holder.**

The length of the suspension should be substantial, and should vary according to the nature of the fishery and the length of the fishing season. For second and subsequent offences, the period of suspension should be lengthened.

24. **Licence cancellation should be invoked for the most flagrant of violations and recalcitrant repeat offenders.**

25. **The holder of a quota licence who exceeds his annual quota by five percent or less should be required to pay a royalty surcharge on the excess. The surcharge should be fixed approximately at the average landed price for the species during the month in which the infraction occurs. Where the licensee exceeds his quota by more than five percent, the Minister should be authorized to deduct the full amount of the excess from the licensee's quota eligibility in the following season, and impose the surcharge. For flagrant and repeat violations the Minister should be authorized to suspend the licensee's right to exercise his quota in the fishery for the following season or to cancel it permanently.**

Quota holders will have incentives to land their full quotas over the course of the season according to stock availability, market conditions and so on. Inevitably, individual fishermen will exceed their quota entitlements inadvertently due to time lags in receiving data on landings, unexpectedly large catches late in the season, and so on. These proposals concerning quotas are designed to make allowance for such contingencies, but to deal more harshly with offenders who seriously abuse their privileges.

CONCLUSION

On the basis of submissions at my public hearings and the Commission's review of the Department's enforcement policies and procedures, I have concluded that a major restructuring and reorientation is required if illegal activities that threaten fish and their habitat are to be successfully deterred. The most significant change would be the creation of a specialized fisheries enforcement unit to strengthen the Department's ability to detect and apprehend offenders. Improved service by prosecutors and a reformed scheme of penalties under the Fisheries Act should buttress such a change.

Later in this report I recommend that the legislation and regulations governing fisheries in the Pacific region be totally overhauled, eliminating the anachronisms, inconsistencies and ambiguities that now confine and hamper effective enforcement. These reforms should provide a valuable supplement to the move toward an improved enforcement regime in the region.

We must bear in mind, though, that the nature of policy itself determines the nature of an effective enforcement effort. Thus, changes recommended in other chapters will reshape demands on enforcement. Smaller, rationalized commercial fishing fleets should be more manageable and thus ease the pressure on enforcement. Quota arrangements will, to a large degree, shift the focus of enforcement from surveillance of vessels on the fishing grounds to ensuring that catches are accurately recorded and reported. Recommendations concerning Indian fisheries in Chapter 14 should go a long way toward eliminating the long-standing friction that has plagued the relationship between the Department of Fisheries and Oceans and Indian fishermen. As well, the changes in approach to habitat management, recommended in Chapter 3, should lead to a more consistent application of the law to other resource users.

The challenges facing the fisheries enforcement capabilities across Canada and the organizational frameworks appropriate to meet them within the Department of Fisheries and Oceans will no doubt vary from region to region. Special demands are placed on enforcement in the Pacific region because of its long coastline, vast river systems, sensitive freshwater habitat and valuable species. Therefore, in any national approach adopted for fisheries enforcement in future, the Department must tailor its policies and priorities in the Pacific region to suit its unique character.

FOOTNOTES

1. Department of Fisheries and Oceans, Exhibit #190, p. 8.
2. B.C. Wildlife Federation, Exhibit #30, p. 4.
3. These estimates and those that follow are reported in Donald Clough, "Compliance Analysis for B.C. Fisheries Licensing and Resource Royalty Program." Prepared for the Department of Fisheries and Oceans, 1979.
4. One study estimated that illegally caught fish in the major fisheries could account for as much as 10 to 15 percent of all value of reported landings: Clough, "Compliance Analysis."
5. Canadian Consolidated Regulations, 1978, c. 827, s. 5.
6. Department of Fisheries and Oceans, Exhibit #190, p. 3.
7. Department of Fisheries and Oceans National Enforcement Program. Primary Data Drawn from the Questionnaire for Fishery Officers (GT), Table 2.
8. Fred M. Woldstad, "Law Enforcement is a Fulltime Profession." Paper presented to the Western Association of Fish and Game Commissioners, Portland, Oregon, 1977.
9. Clough, "Compliance Analysis."
10. Department of Fisheries and Oceans, Regional Review of Inshore Patrol Vessels - Pacific, 1981, p. 3.
11. Motor Vehicle Act, RSBC 1979, c. 152, s. 76.
12. Mr. A. Gibson, Chief of Management Services, Field Services Branch, Department of Fisheries and Oceans, transcripts of public hearings, Volume 65, p. 13554.
13. Murray Rankin and Tim Leadem, "The Fisheries Act and Water Pollution." Paper presented to the Provincial Court Judges Association of British Columbia, 1981. pp. 19-20.
14. Donald Clough, "Optimization and Implementation Plan for Offshore Fisheries Surveillance." Prepared for the Department of Fisheries and Oceans, 1980.

CHAPTER 17

CONSULTATIVE ARRANGEMENTS

> *We're responsible for enforcing laws and regulations, and I suggest that we must do that with flexibility and understanding; the sort of understanding that comes from knowing the local conditions; knowing the local fishermen, their problems, and the problems of that fishery.*
>
> D.D. TANSLEY[1]

Participation by the public and special interest groups in the decisions of public agencies is becoming an increasingly important part of the governmental process. Formal structures and informal channels for consultation and advice have proliferated in wide variety. This phenomenon is undoubtedly due in part to the natural evolution of the democratic system and reactions against authoritarian government, and in part to the growing complexity of governmental regulation, which create a need for outside advice, specialized knowledge and cooperation.

Effective consultative and advisory processes are especially important for the fisheries for several reasons. First, the public policy makers, managers and administrators make decisions that have a direct impact on the welfare of thousands of individuals and companies; and the government, through fishing licences, has legal relationships with far more people than in most other spheres.

Second, fisheries management, catch regulation and allocation, habitat management and other aspects of fisheries policy are exceedingly complicated (as this report reveals). This calls not only for mutual understanding on the part of the regulators and those being regulated of the problems faced by each, but also for the pooling of expertise.

Third, the fisheries are characterized by conflict. Fishing groups compete vigorously for the same resources, and their collective interests are pitted against those of others whose activities impinge on fish. Strident claims and friction can be moderated through effective consultative processes. Without them the regulatory agency becomes the centre of criticism and, facing opposition on all sides, finds it difficult to make needed changes.

Finally, the nature of the fisheries is such that a government cannot hope to properly manage the resource and fishing activity without cooperation in providing information, help in designing effective regulations, and willing compliance with the rules. In a period of policy reform, cooperative relationships are even more critical.

During the last decade or so, the Department's Pacific region has responded to these needs by creating a host of consultative committees, advisory boards, task groups and other channels for liaison with the interested public. These provisions now consume a good deal of valuable time and effort on the part of both public officials and private participants. Yet they have come under heavy and widespread criticism at my public hearings and are being undermined by a lack of confidence. Unless they receive more support from those involved and more credibility in the eyes of the public, the effort may not be worthwhile.

I have therefore made a special effort to investigate the deficiencies of the present consultative arrangements, and participants have responded generously with commentary. The challenge now is to design a more coherent and effective system, which is the purpose of this chapter.

In other chapters, I have dealt with organizational arrangements for specific purposes that involve external advice and consultation. My proposals for improving consultation and accountability in resource management (in Chapter 4), for improving channels for public participation in resource enhancement (in Chapter 5), to create a new body with responsibilities for commercial licensing and fleet development (in Chapter 8), to create special advisory committees to assist with licensing reforms (in Chapters 9 and 10, among others), all touch on the consultative process. Here, my concern is with consultative policy generally, and how to design an organizational framework that will efficiently channel information, advice and criticism between the Department and the interested public.

CURRENT CONSULTATIVE ARRANGEMENTS

The Department now has about 20 advisory bodies.[2] Three are linked with international fisheries commissions, one has national responsibilities, but most are concerned with particular interests or programs in the Pacific fisheries. Their structure, procedures and lines of communication vary widely.

Consultative Bodies

The senior consultative body for the Pacific region is the Minister's Advisory Council, consisting of representatives of fishing organizations who give general advice to the Minister and serve as a sounding board for policy proposals. This is a large body, comprising 17 members. It has apparently eclipsed the Pacific Region Fisheries Management Advisory Council, which was established to assist the Director General in the Pacific region, but has been inactive in recent years.

The Field Services Branch of the Pacific region has 5 regional committees, each consisting of about 10 members, to assist with fisheries management problems in specific areas, namely the Skeena River, Queen Charlotte Islands, Central Coast, Johnstone Strait (for chum salmon) and the Fraser River.

Other committees are concerned with particular fisheries. The Sport Fish Advisory Board consists of 20 representatives of commercial sportfishing and recreational interests, and provides advice on sportfishing policy. The Herring Industry Advisory Board and the Herring Spawn-on-Kelp Committee assist with planning, managing and developing herring fisheries. The Groundfish Advisory Committee performs similar functions for groundfish. A temporary committee has been advising the Minister this year on implementing changes to the halibut licensing system stemming from this Commission's Preliminary Report, and another such committee is deliberating on the reforms proposed for the food herring fishery.

Subcommittees of advisory committees have been established from time to time to deal with specific issues such as catch allocation. Conspicuously lacking is an advisory group for either the Indian fishery or habitat management.

Advice on fisheries research is channelled through the national Fisheries and Oceans Research Advisory Council. In the Pacific region, the Salmonid Enhancement Board and the Task Group (described in Chapter 5) are concerned with the enhancement program. The Vessel Licence Appeal Board (described in Chapter 8) handles appeals. A special committee was established to advise on proposals for fleet reduction following publication of this Commission's Preliminary Report. And, of course, this Commission itself has involved intense consultation.

The International Pacific Halibut Commission has an advisory board of fishermen and vesselowners, and the International Pacific Salmon Fisheries Commission has advisory groups from both the United States and Canada. The Department also calls on interested fishermen for advice in negotiating international fisheries matters such as the salmon management arrangements with the United States and the offshore tuna fishery.

While these groups serve as forums for discussion, frequently recommending courses of action to the Minister or regional officials, none of them has the authority to make binding decisions, nor do they comprise any structured consultative system. And, most are chaired by an officer of the Department.

In addition to formal consultative forums, a good deal of informal discussion takes place between Departmental officials and fishermen at meetings and conventions, in private interviews and in the field.

SHORTCOMINGS

My comments in the remainder of this chapter are directed to only some advisory and consultative bodies. I set aside those associated with the international commissions because they relate to Canada's arrangements with foreign countries, which are beyond my terms of reference. The research advisory council was appointed only a few months ago and cannot yet be evaluated. I have dealt with external participation in administering commercial licensing and appeals, and in directing the enhancement program in earlier chapters. A role for public hearings is described in Chapter 3. I do not attempt to assess any of the temporary advisory bodies. Thus I focus on the arrangements for consultation and advice on general policy affecting the management of Pacific fisheries and on the problems relating to particular interests.

With a few exceptions, most commentators are distressingly critical of the consultative process, describing it in such terms as an "exercise in frustration,"[3] "window dressing"[4] and a "dialogue of the deaf."[5] Although specific criticisms vary, many who have served on advisory committees complain that they lack direction, clear terms of reference and orderly procedures. Insufficient advance notice of issues to be discussed and inadequate information for informed discussion are also common complaints. Others have charged that consultations are a public relations exercise on the part of the Minister or the Department, only rubber-stamping decisions already made. And most worrisome, in my opinion, is the widespread perception that advice is not seriously sought or listened to.

> Here in the Pacific region we currently have a consultative process made up of a staggering number of representative sections, industry committees, governmental agencies, etc, all theoretically participating in the ongoing mechanisms of fisheries management. In reality we have near paralysis made up of endless bureaucratic reorganization, plain inertia, empire building, and, on the part of all - endless posturing. Positions are usually polarized and entrenched with a pervading reluctance to make positive proposals for fear they will be viewed as a sign of weakness. The D.F.O.

> actually seems to favour these fractionate conditions within the industry. The resulting frequent lack of consensus has repeatedly seen D.F.O. officials making arbitrary regulations that often are poorly thought out, poorly implemented and on occasion having no foundation in law.[6]

But while the Department is often harshly criticized, it does not bear the whole responsibility for unrewarding consultations.

> Fishermen, user groups, etc. are themselves not totally guiltless, if for nothing other than manifestations of human nature such as greed, lack of concern for the resource and the aforementioned posturing on issues. There is unquestionably a need to raise the level of responsibility assumed by all participants . . . .[7]

Clearly, we have some distance to go to overcome the present lack of confidence in the consultative process and to create a system that will generate and channel constructive communications between the fisheries authorities and the interested public. Bureaucratic resistance to the often irksome task of consulting outsiders must be overcome. The approach of private participants must become less critical and self-serving, and more compromising and constructive. These changes will take time and effort. But they will be promoted by a suitable organization and procedures, and these need fundamental reform.

TOWARD IMPROVED CONSULTATION

The present plethora of consultative bodies has evolved over time through *ad hoc* responses to apparent needs and circumstances, and consequently now lack order and coherence. The Department has apparently never sought professional advice on how to organize and conduct public participation, so, not surprisingly, present arrangements fail to satisfy the parties involved.

The first requirement for improving the consultative system is a coherent policy on the subject. The Department should therefore articulate a general policy on the issue of external consultation and advice. This should take the form of a document for public circulation, outlining the Department's consultative structures and procedures and arrangements for participation.[8] Meanwhile, some guidelines and basic principles are called for. I therefore recommend —

1. **The Department should articulate general policy and procedures for effective consultation with the interested public. This should provide for the following:**
   - i) **A consultative or advisory body should be appointed to deal with each branch of fisheries policy in which there is a distinct and focused public interest.**
   - ii) **Each consultative body should have clear, written terms of reference to govern its deliberations and a specified line of reporting and accountability.**
   - iii) **Members of consultative bodies should be formally appointed by the Minister or an official delegated by him for specific terms. They should be reimbursed for the expenses they incur in participating in meetings.**
   - iv) **The membership of any consultative body intended to provide advice on policies that require balancing conflicting interests should not include delegates who are answerable to the interested groups.**
   - v) **The number of members should be the minimum required for balanced understanding of the issues.**
   - vi) **A Departmental official should be appointed as a nonvoting member to each consultative group to serve as its secretary and to provide information and technical assistance.**
   - vii) **Each group should design and put in writing its own procedural guidelines for conducting its deliberations.**
   - viii) **Minutes should be kept of all meetings and, except for the record of deliberations that are agreed to be confidential, they should be available to others.**
   - ix) **Agendas should be circulated well in advance of meetings, together with supporting documentation.**
   - x) **Every consultative group should be responsible for preparing a written report on its deliberations at least annually.**

Other structural and procedural arrangements (whether nominations for members should be solicited, how chairmen are to be selected, who will draft agendas and so on) will vary according to the responsibilities and needs of different groups.

I emphasize the importance of periodic reporting. Reports provide the essential medium of accountability for a group's effort and conclusions, and help to focus discussion at meetings. Reports are also needed to communicate conclusions and advice. Without this communication, the effort provides little more than therapy for those involved.

Careful preparation and documentation in advance of meetings also facilitate deliberations. Hard facts can cut through speculative and unproductive argument, and explicit propositions focus discussion. While some have criticized the Department for formulating policies before discussions, the criticism is justified only if decisions have already been made, so that ensuing debate will have no influence.

In designing consultative structures, I am concerned first, that they maximize the effectiveness of consultations; second, that existing structures be preserved and adapted where possible to minimize disruption; and third, that the system will funnel representations to public officials in an orderly way. In this connection I am particularly concerned about the representations and lobbying that circumvent the consultative system, through delegations to the Minister, meetings and interviews with senior officials, and endless phone calls with demands and complaints. The Department apparently tries to follow an open-door policy, accommodating all these representations; but the appeal of this approach is superficial. The Department should, of course, respond to private concerns, but by tolerating and encouraging all these informal representations, which are usually not public and are often between acquaintances, the consultative structure is undermined. It also exhausts the time of senior public officials, who seem to spend an inordinate proportion of their time in meetings.

These methods cannot provide the Department with balanced advice. Clearly we need a consultative system that will relieve officials of the flurry of unstructured lobbying so they can attend to their responsibilities in the context of publicly articulated advice from interested private groups. For this to work, interested individuals and groups must have confidence that the channels provided for this purpose offer the most effective means of exercising influence.

In the present context of fisheries policy, reforming the consultative structures is especially critical; they must be flexible and adaptive, but they should also be as simple as the varied requirements permit. My proposals incorporate a number of suggestions made by participants in the Commission's hearings.

A Pacific Fisheries Council

The highest-level consultative structure needs to be reorganized urgently. The existing Minister's Advisory Council is far too large to analyze and reach conclusions on complicated problems. It is also badly constituted; although individual members are knowledgeable leaders in the fishing community, they are, in effect, delegates of special interest groups. So it is difficult for them to avoid defensive posturing, to agree to compromises without "going back to the executive," and to discuss problems and proposals in confidence. Thus, the council cannot be expected to provide a consensus on complicated policy questions. Moreover, it has insufficient autonomy.

I therefore recommend that a new high level council be appointed:

2. **The government should replace the existing Minister's Advisory Council with a new Pacific Fisheries Council with the following characteristics:**
   - i) **The council should be provided for in legislation.**
   - ii) **The council's terms of reference should embrace all matters that fall within the responsibility of the Minister of Fisheries and Oceans as they relate to Pacific fisheries, and it should be empowered to consider industrial policies, international arrangements or other questions when they are referred to it by the Minister.**
   - iii) **It should consist of not more than eight members, appointed by the Minister for staggered three-year terms. They should be appointed in their personal capacities and selected for their knowledge, experience and judgement, and not for their affiliations. Membership should not be restricted to those who have a special interest in fisheries. The chairman should not be a public official. Members should be reimbursed for their expenses and paid an honorarium for the time they spend on council business. Adequate office and secretarial facilities should be available to the chairman.**
   - iv) **A senior official of the Department should be appointed as a participating but nonvoting member of the council, and to provide administrative support and information.**
   - v) **The council should determine its own agendas, taking account of any matters referred to it by the Minister. It should meet as frequently as it deems necessary, but not less than four times each year.**
   - vi) **It should be required to issue a public report to the Minister at least annually, and it should make other reports to the Minister as appropriate.**

Balance and perspective in the council's deliberations are likely to be enhanced by including one or more members whose interests and experience are not narrowly focused on fisheries. The Salmonid Enhancement Board (among many other consultative groups in other fields) has demonstrated the value of broader public viewpoints.

I intend that this council be given a high status, that it become the central forum for consultations between the Minister and public interests, and that it be the channel for coordinating communications with the more specialized advisory committees recommended below.

The new council should be involved in other policy changes, so I strongly urge the government to establish it immediately. (Pending legislative changes, the members should be appointed less formally.) Once the new council is established, the Minister's Advisory Council should be dissolved and the dormant Pacific Region Management Advisory Council should not be rejuvenated.

The new council should be consulted regarding the structure of the other advisory groups I recommend below. The existing temporary advisory committees should be asked to complete their work as quickly as possible, and no new ones should be struck without prior consultation with the council.

Specialized Advisory Committees

In addition to the Pacific Fisheries Council, more specialized consultative bodies are needed to deal with the narrower, but often complicated, problems associated with particular fisheries, regions and interest groups. Many such groups already exist, and require only some modifications in structures and procedures to fit into the consultative system I propose; others should be established. The advisory committees fall into distinct categories.

Fisheries advisory committees These are committees to address the problems of managing particular fisheries, such as salmon, herring, abalone and the mariculture industry. The number and variety of these specialized groups will depend upon interests, needs, and developments in related policies; they need not be permanent committees in all cases.

3. **A special advisory committee should be appointed for each of the significant fisheries that have special regulatory policies, including the sport and Indian fisheries, the separately licensed commercial fisheries and mariculture.**
   - i) **These committees' terms of reference should direct their attention to the coastwide problems of managing the specific fisheries.**
   - ii) **Members should be appointed by the Minister (or, at his discretion, by the Director General) for definite terms, drawing upon (without being limited to) representatives of organized groups. They should be reimbursed for expenses associated with committee activities.**
   - iii) **Each committee should choose its own chairman, establish its own working procedures within general policy guidelines, and determine its own agendas taking account of matters referred to it by the Director General or the Pacific Fisheries Council.**
   - iv) **The Director General should appoint a Departmental official with special competence in the relevant fishery to serve as a participating but nonvoting member of each committee, and to provide information and technical assistance.**
   - v) **Each committee should report in writing to the Minister through the Pacific Fisheries Council at least annually.**

The existing Sport Fish Advisory Board received mixed appraisals at the Commission's hearings. Apparently it is too large, and the representation of recreational and commercial sportfishing interests unbalanced. These concerns should be considered when the committee is reconstituted.

In Yukon, sportfishing interests are geographically separate and different in kind from coastal sportfishing interests, concentrating mainly on freshwater fishing. For these reasons, they should be represented in a separate Yukon sportfishing advisory committee as I propose in Chapter 20.

Some other fisheries call for regional representation as well. I have discussed this need in connection with salmon and herring management in Chapter 4. The area-based licensing arrangements proposed in Part III might generate a need for regional consultative groups for other commercial fisheries also. Such supplementary arrangements should be decided in consultation with the relevant fisheries advisory committees.

Two related points should be made especially clear in specifying the scope of these committees' functions. First, they should not concern themselves with the fractious question of catch allocations among competing groups. The general policy on this issue should be established at a higher level in consultation with the Pacific Fisheries Council, and specific arrangements should be laid out in pre-season fishing plans as proposed in Chapter 4. However, these committees should be involved in setting objectives for resource management and appraising the results achieved. Second, these committees should not concern themselves with day-to-day in-season management, but rather with policy, planning and results.

The Pacific Fisheries Council should append the reports of fisheries advisory committees to its own reports to the Minister, and should be encouraged to comment on the committees' conclusions, put them into a broader context for the Minister, and add supplementary advice.

Fisheries conservation committees In Chapter 5 I noted the unsatisfactory structure of the Salmonid Enhancement Task Group and suggested that it should be reorganized into three regional advisory groups with terms of reference expanded to include habitat management. The Department has hitherto had no advisory group concerned with habitat management, though this probably attracts the widest public interest of all of the Department's responsibilities. Many of the people and organizations with this interest (for example, fishing and environmental groups, Indians, and other resource industries) are also interested in enhancement and indeed they are represented on the present task group. Because habitat management and enhancement are inextricably linked, it is logical for one advisory group to deal with them both.

This organization should be regionally based to focus local public concerns and to facilitate participation. I propose that it consist, initially at least, of three groups.

4. Three regional Fisheries conservation commitees should be appointed, one each for the north, south and Fraser River administrative areas.

- **i) These committees' terms of reference should direct their attention to matters relating to enhancement and habitat management in the relevant area.**
- **ii) They should consist of not more than eight members appointed by the Minister (or, at his discretion, by the Director General) for definite terms, drawing upon (but not being limited to) representatives of organized groups with relevant interests in the region.**
- **iii) The Area Manager should appoint one of his staff to serve as a participating but nonvoting member of the committee and to provide technical advice and documentation.**
- **iv) Each committee should choose its own chairman, establish its own working procedures within general guidelines and determine its own agendas, taking account of any matters referred to it by the Director General, Area Manager or Pacific Fisheries Council.**
- **v) Each committee should report at least annually to the Minister through the Pacific Fisheries Council.**

These regional groups will focus public concerns and advice in each of the three regions, which are to some extent complemented by the regional organization of the provincial resource management agencies, the Department itself, and its geographic working groups. I suggest that in addition to their regional activities, the Department support a joint annual meeting of the committees at which time they can review with the planners and the Salmonid Enhancement Board the general direction of the enhancement and inventory programs as well as habitat management policy, and communicate their conclusions and comments in a report to the Minister. These groups could also channel public advice on the use of the Fisheries Conservation Fund recommended in Chapter 3.

Special regional management committees The Department has already established special committees for consultation on fisheries management in certain areas, referred to earlier. From time to time other special advisory groups will be needed to channel public concerns and advice in particular areas. For these I recommend —

5. Local advisory committees should be appointed to deal with special fisheries habitat or management problems in particular areas where these problems cannot be adequately dealt with by the fisheries advisory committees or the fisheries conservation committees.

- **i) These committees' terms of reference should be defined geographically as well as with respect to the specific problems to be considered.**
- **ii) The chairman and members of these committees should be appointed by the Minister (or, at his discretion, by the Director General or Area Manager) for definite terms, drawing upon (without being limited to) representatives of local interest groups. They should be reimbursed for expenses associated with committee work.**
- **iii) The Area Manager should appoint one of his staff to serve as a participating but nonvoting member of each committee and to provide technical advice and documentation.**
- **iv) Each committee should report at least annually in writing to the Minister through the Pacific Fisheries Council.**

Within these guidelines, arrangements for consulting with local interest groups should be adapted to specific needs. In the long term, I foresee a general shift from coastwide consultative structures to regional and local bodies capable of providing more intimate communication between regulatory authorities and local interests.

Several participants in the Commission's hearings suggested that the government should establish formal river-basin boards to focus public concerns about the management of particular river systems.[9] Some proposals involve delegating regulatory powers to these boards along the lines of Conservation Authorities in Ontario,[10] or the river boards in the United Kingdom and some European countries.[11] The proposed scope of these boards goes well beyond fisheries policy to include regulating other resource activities, industrial development and regional planning. Here, the province has responsibility for most of these activities and so any initiatives toward formal planning structures along these lines should come from it, and I hesitate to suggest that the federal government should take a leading role. However, if they are established, the federal government should press for representation by the Department of Fisheries and Oceans on those established for rivers that support salmon.

Direct Communications With the Public

A few years ago, the fisheries were mainly the concern of enclaves of commercial fishing interests in coastal communities, and fisheries policy was directed accordingly. Today, in contrast, interest extends broadly to hundreds of thousands of commercial, sport and Indian fishermen, environmental organizations, businesses and the public at large. This burgeoning interest should be encouraged because it supports advances in fisheries policy. But, with the notable exception of the Salmonid Enhancement Program's public information effort and its publication Salmonid, the government has not responded to this interest in an organized way. A periodical, The Sounder, reports current developments in fisheries administration, but its audience is the public service itself. And a Fishermen's Newsletter has been published only sporadically in recent years.

It is too much to expect members of consultative groups to regularly communicate to the fishing community the current developments in management and policy. And the newsletters of organized groups cannot be counted on to present the issues in a comprehensive and balanced way.

This Commission's hearings have revealed a great deal of misunderstanding about fisheries matters and a thirst for information. The latter is reflected in the media's recent attention to fisheries and in one west-coast newspaper's sponsorship of a significant fund-raising effort for salmonid enhancement. The government should recognize a responsibility to inform the public about the resources under its stewardship, to explain management problems and to provide current information about policy developments.

I therefore propose a new and vigorous public information program, centered on a high-quality periodical for wide distribution. This magazine should combine and absorb the Department's existing publications mentioned above. Thus—

6. The Department should replace its existing publications with a single high-quality, readable periodical for wide distribution to inform the public about fish resources, management problems and policy developments.

The publication should stimulate interest with feature articles and photography. A good example is the highly successful periodical, ForesTalk, published quarterly by British Columbia's Ministry of Forests.

CONCLUSION

The Department has made an impressive effort to develop consultative mechanisms; but, with some exceptions, it has not been highly successful. Badly structured advisory groups and faulty procedures have undermined confidence in the process, the essential element of its success. The arrangements need thorough reorganization within an orderly framework, as I have proposed.

Consultation, like democracy, is hard work, but no satisfactory alternatives exist. If the government demonstrates a commitment to the process by putting suitable structures in place and inviting meaningful participation in policy making, I have no doubt that the response will be rewarding. As one participant pointed out, fishermen—

> . . .collectively possess a vast body of knowledge about the fishery and local conditions germaine to its management. Their potential to offer good data and management advice is considerable.[12]

I should add that governments have the responsibility to govern, and they cannot delegate their responsibilities to private groups. More specifically, the Department is responsible to Parliament for managing the fisheries, and while it should systematically consult and listen to advice as I have proposed, it must make final decisions and stand accountable to Canadians as a whole. Moreover, the Department's obligations to consult are not infinite; it should feel obliged to give consultative groups timely information and a reasonable period to provide advice, but having done so and seriously considered the advice received, it should not delay action because of lethargy or a lack of consensus on the part of advisors.

Finally, because any private interest group's knowledge and experience is specialized, consultations on some matters are more appropriate than on others. For example, who should have the right to obtain fishing privileges is a favourite topic among fishermen. But the allocation of rights to use public resources is a question of high public policy, which must be settled with reference to legal, social and political considerations. Thus, it should be dealt with in legislation and provisions for allocating fishing licences (as I propose). And any unfairness or hardship that results should be referred to the appeal process. Consultative groups with vested interests in the fisheries should not be encouraged to dwell on this issue.

Everyone familiar with the fisheries knows that the commercial, sport and Indian fishing communities contain at least the normal share of unconciliatory people. Some refuse to recognize opposing positions even in the face of reasonable evidence, and others simply do not want to face the need for change. Some organizations have adopted uncompromising positions and carry deep animosities fuelled by years of fractious disputation. But this Commission's hearings have revealed that within the fisheries are many thoughtful, public-spirited and well-informed people. If the government calls on these people, consultation will be constructive.

FOOTNOTES

1. D.D. Tansley, Deputy Minister, Department of Fisheries and Oceans, transcripts of the public hearings, Volume 67, p. 13824.
2. The number is not altogether clear because some bodies are temporary or inactive. The 1982 Commercial Fishing Guide lists 16, including three attached to international commissions.
3. Pacific Coast Fishing Vessel Owner's Guild, Exhibit #194, p. 1.
4. Central Native Fishermen's Cooperative, Exhibit #139, p. 2.
5. D.A. Pepper, Exhibit #28, p. 12.
6. A.H. Meadows, Exhibit #46, p. 18.
7. Exhibit #46, p. 19.
8. For an example of the kind of well-defined policy statement I have in mind, see the recently published Public Involvement Handbook. Province of British Columbia, Ministry of Forests, Victoria, 1981.
9. See, for example, Save the Bulkley, Exhibit #53.
10. R.S. Campbell, P.H. Pearse, A.D. Scott and M. Uzelac, Water Management in Ontario: An Economic Evaluation of Public Policy. Osgood Hall Law Journal, Volume 12 No. 3, 1974. pp. 475-526.
11. W.R. Derrick Sewell and Mary L. Barker, Water Problems and Policies. Cornett Papers, Victoria, 1981, Vol. 1.
12. The Victoria Charter Boat Association, Exhibit #175, p. 2.

CHAPTER 18

FEDERAL ARRANGEMENTS WITH BRITISH COLUMBIA

The management of the fisheries resource has a serious jurisdictional problem at its very center. Jurisdiction over fisheries by the British North American [Act] is federal, while jurisdiction over competing resource users, a prime example being logging, is provincial.

THE PACIFIC GILLNETTERS ASSOCIATION[1]

Repeatedly, during the course of this inquiry, my attention has been drawn to the interface of federal and provincial responsibilities in fisheries matters. The impact of one government's policies on those of the other has emerged piecemeal in relation to commercial fisheries administration, processing and product regulation, sportfishing, enforcement, enhancement, and most importantly, habitat protection. Altogether, this interdependence is crucial to the way fish resources are managed and used.

Yet explicit arrangements to govern the way the two governments will reconcile their separate and sometimes conflicting interests and responsibilities are surprisingly lacking. This has led to uncertainty, confusion and even suspicion between the two public services, and has resulted also in wasteful duplication of effort, frustrations for third parties and occasional political crises. For these reasons, the absence of a formal working relationship between the two governments has emerged as a most serious deficiency in the existing policy framework for the Pacific fisheries. This has led me to the inescapable conclusion that a formal intergovernmental agreement between the governments of Canada and British Columbia is needed to ensure their activities in fisheries matters are harmonized, duplication of effort is reduced and conflicts are minimized.

The need to reconcile the policies and practices of the federal and provincial governments was emphasized in my public hearings by participants with interests ranging widely from mariculture to environmental protection, forestry, mining, and resource enhancement. And nearly all of those involved in fishing — commercial, recreational and Indian alike — expressed concern about the interdependence of federal and provincial authority especially in managing fish habitat.

The reforms proposed in this chapter could not be discussed with the two governments directly in public hearings, since, understandably, they were not disposed to speculate officially and publicly about possible new arrangements and reallocations of responsibilities which, in this country, are normally subjects of political negotiation. However, I believe my proposals offer a feasible framework for reconciling the interests of the two governments on a range of important fisheries problems.

In this chapter I propose a comprehensive agreement between Canada and British Columbia on fisheries matters, clarifying their respective roles, responsibilities and authority in various aspects of fisheries administration as well as their joint working arrangements. The agreement would incorporate existing joint undertakings, most of which are informal, obsolete or based on inadequate documentation.

None of the recommendations below imply alteration of the existing constitutional division of responsibilities; all can be effected through a contractual undertaking between the two governments in the form of the proposed agreement.

THE INTERFACE OF FEDERAL AND PROVINCIAL RESPONSIBILITIES

Under the Canadian constitution, legislative responsibilities for fisheries are divided between the federal Parliament and the provinces. In many respects the division of authority, as interpreted by the courts over the decades since confederation, has proved awkward for fisheries management, particularly for regulating fishing, mariculture, fish processing and marketing, and for habitat protection. Some of these difficulties have been resolved through arrangements between the federal government and British Columbia, and relatively smooth processes have resulted. For others, such arrangements are informal or altogether lacking, and serious problems have emerged.

The division of constitutional responsibilities for fisheries management is both tangled and subtle. Under the 1867 British North America Act (recently incorporated into the Constitution Act 1982), the federal parliament has jurisdiction over "sea coast and inland fisheries." This general authority enables federal regulation of fishing activities in both tidal and nontidal areas of the province, and is the basis for the Fisheries Act and its myriad regulations aimed at commercial, sport and Indian fishing. But as owner of most of the land underlying fresh watercourses in British Columbia and in virtue of its constitutional jurisdiction over property and civil rights, the province may confer fishing privileges in nontidal waters and thus regulate fishing activities indirectly.

Collision between the two governments in this area of fisheries management has been averted for decades through intergovernmental arrangements. The federal government has retained responsibility under the Fisheries Act for managing all tidal fisheries and for managing salmon even in freshwater. But the province administers and enforces the conservation regulations for freshwater species (all trout, including anadromous steelhead and cutthroat), also enacted under the federal Fisheries Act. The province issues nontidal sportfishing licences under provincial legislation, and exercises complete control over oyster leasing. Although these arrangements have been in place for many years, they are not supported by formal agreements. The only modern and clearly articulated intergovernmental arrangement is the 1979 federal-provincial agreement to sponsor the Salmonid Enhancement Program.

A similar jurisdictional overlap occurs in mariculture. As the owner of most of the foreshore on the Pacific coast, the province controls access to mariculture fisheries such as oysters and clams in the intertidal zone. The federal government is the undisputed owner of the seabed underlying Canada's territorial waters off the coast, but ownership of the inside waters (east of Vancouver Island, the Queen Charlottes and a line joining them) is in dispute and before the courts. If the province is successful, its potential for engaging in mariculture management and leasing would broaden considerably. Similarly, both governments claim jurisdiction over marine plants. Since 1912, the province has had administrative responsibility for oyster culture under a formal agreement with the federal government, but arrangements between the two governments for other species and marine plants are informal or lacking.

A second area of constitutional overlap concerns fish processing and marketing. The provincial government is responsible for shore-based processing facilities and the sale of fish in the province. (These functions come under provincial property and civil rights responsibilities.) But because most fish produced commercially on the Pacific coast are shipped out of the province, the Department of Fisheries and Oceans is responsible for inspecting them under its jurisdiction over interprovincial and international trade. Through informal arrangements between the two governments, quality standards are applied to fish marketed in the province as well.

A third area of overlap concerns fish habitat protection. In this area, federal fisheries responsibilities are pitted against provincial ownership and control over land and freshwater. No formal procedures are in place to guide the administrators of the two governments in this sphere, although recently, in the wake of the highly publicized incident at Riley Creek and the subsequent confrontation between the two governments, officials agreed to consult in an attempt to forestall such crises in the future. But these arrangements relate only to logging, they are informal, and they provide no system other than communication to resolve conflicts.

These fragmentary and inconclusive arrangements between the two governments are inadequate. In a few cases, the respective roles of the two governments are recognized and documented in a formal agreement; in others, the recognition is only tacit; while in many important areas, mutual responsibilities are completely undefined.

AN INTERGOVERNMENTAL FISHERIES AGREEMENT

To deal with matters of mutual concern to the governments of Canada and British Columbia relating to fisheries and fish habitat management, I propose a formal comprehensive agreement. This agreement, which I refer to as the Canada-British Columbia Fisheries Agreement, should clarify and harmonize administrative responsibilities, establish new cooperative programs, and set out procedures and working arrangements for the resolution of problems.

I suggest that the agreement be negotiated and signed by the federal Minister of Fisheries and Oceans and the provincial Minister of Environment on behalf of their respective governments.

Since some of the issues that should be included in the agreement are more or less separable, of varying complexity and likely to take differing times to negotiate, I propose a general framework agreement with a number of supplementary components. The framework agreement would set out a general commitment to cooperation and the scope of matters to be included. The supplementary agreements would deal with more specific matters. I thus recommend —

1. **The Government of Canada should invite the Government of British Columbia to join in a comprehensive intergovernmental agreement on fisheries matters. The agreement should consist of a master or framework agreement providing for supplementary agreements on the following:**

   i) **A renewed Salmonid Enhancement Program.**

   ii) **An inventory of aquatic habitats.**

   iii) **Cooperative arrangements for habitat management and pollution control.**

iv) Provincial responsibilities in administering and regulating freshwater fisheries.

v) Integration of freshwater and saltwater sportfishing licences and related administrative arrangements.

vi) Division of administrative responsibilities for marine shellfish and plants, mariculture, and the gathering of statistical data on marine fisheries.

I have explained the need for each of these in previous chapters. The issues to be dealt with in the agreement can be summarized briefly.

Salmonid Enhancement

I have made detailed proposals for a renewed intergovernmental salmonid enhancement agreement in Chapter 5. The present enhancement agreement, which will expire in 1984, requires only some modifications to incorporate the changes I have recommended. This document is well designed and might serve as a model for other components of the proposed agreement.

Aquatic Habitat Inventory

The urgent need for an inventory of freshwater and estuarial fish habitats, and the interest of both governments in this information, is explained in Chapter 3. The agreement should set out cooperative arrangements for an intergovernmental program of systematic field investigations, data collection and data analysis to provide the basis for strategic planning for the fisheries, and integrated resource management and development.

Habitat Management

In Chapter 3 I recommended that the Department should play a more aggressive role in integrated resource planning in cooperation with other resource management agencies, which in British Columbia are mostly ministries of the provincial government. The referral arrangements for assessing proposals for industrial projects and other developments are the pivot between the two governments in habitat management, and these should be addressed in the federal-provincial agreement. Because it is so heavily involved in allocating forest, water and other natural resources in areas that fish depend on, the province must be encouraged to accept responsibility for protecting habitat in planning and regulating upland activities. This need is particularly urgent for salmon habitat.

The agreement should set out explicit procedures to be followed by provincial agencies and the Department in dealing with proposed developments and projects affecting fish habitat. These should include referral arrangements and, where appropriate, means of delivering federal approvals through provincial authorizations such as pollution control permits and resource tenure documents. The mitigation and compensation measures proposed in Chapter 3 also might be channelled through these provincial authorizations.

Finally, the agreement should deal with cooperative arrangements in responding to spills of oil and toxic chemicals. I explained in Chapter 3 that both governments have legislation on this matter. In 1981 an understanding between them provided for cooperation in maintaining a continuous capacity to respond to spills and to deal with crises. The agreement should incorporate these informal arrangements.

Freshwater Fisheries

As already explained, the province has assumed, over many decades, full responsibility for administering freshwater fisheries other than salmon (but including steelhead and other anadromous trout). These fisheries are almost entirely recreational with minor commercial operations. The province maintains staff and programs for the full range of freshwater fisheries management including fishing regulation, enforcement, fish culture, habitat management and information. Apart from licensing, the entire program operates under federal legislative jurisdiction through tacit agreements between officials of the two governments. Formal recognition of these arrangements should be provided in the agreement.

Sportfishing Licences

In Chapter 15 I proposed that the federal saltwater and provincial freshwater sportfishing licences be integrated. The agreement should provide for this and related administrative arrangements, including the appointment of agents to issue them, the collection of licence fees and the distribution of revenues between the two governments.

Marine Fisheries

The federal government has retained complete administrative responsibility for marine fishing offshore, but the province's role is significant in neritic, intertidal and aquacultural fishing operations. Earlier in this chapter I noted that the province has assumed responsibility for administering oyster culture and (under uncertain arrangements) clams within oyster leases and wild oysters elsewhere. The federal government has retained administrative authority for other shellfish.

Both governments are involved in administering other forms of mariculture. The province administers freshwater fish farms through a system of licensing and inspection, while the federal government administers marine salmon culture with provincial licensing of the freshwater propagation facilities.

Both governments claim jurisdiction over marine plants, though only the province has a stock-assessment program, a research program and a licensing system. Some years ago senior officials agreed that the province should manage the resource subject to a federal review of harvesting plans for their possible impact on fish habitat. Recently, however, disagreements have arisen over approvals of harvesting licences.

This division of responsibilities for shellfish is without apparent logic, and the overlapping responsibilities for marine plants and mariculture are unsatisfactory.[2] These matters should therefore be resolved and incorporated into the formal intergovernmental agreement.

The allocation of responsibilities for administering shoreline fisheries should be pragmatic. I suggest that the federal government concentrate on sea fisheries, which are its heaviest responsibilities in any event. The arguments for provincial administration are strongest for operations on the foreshore. Thus, the provincial responsibilities for oysters should be expanded to include other intertidal shellfish species. The oyster culture industry already markets most of the clams harvested and is diversifying into the harvesting and culturing of other shellfish, which call for the same kind of licensing arrangements. But even where the federal government is to take the lead in administering a species, the agreement should provide links to provincial government policies and programs, such as those for freshwater resources, small business development and Crown land allocation.

Finally, both governments are involved in regulating fish processing, with the province licensing and controlling the operation of facilities for landing and processing, and the federal government being concerned with quality standards. These joint interests offer an opportunity for constructive cooperation in collecting statistical data on landings and other matters, as I suggested in Chapter 8. Elsewhere I emphasized the importance of improving catch data for purposes of managing and administering royalties and quotas. Thus, collaboration in data collection and perhaps also in inspections and enforcement should be provided for in the agreement.

INTERGOVERNMENTAL LIAISON

The numerous and continuous joint interests of the two governments in matters of fisheries and fish habitat management call for a mechanism for regular consultation between them. Moreover, the cooperative ventures I propose above will require close communication, cooperative planning and supervision.

During the 1950s a Federal-Provincial British Columbia Fisheries Committee was established to bring together the two Deputy Ministers responsible for fisheries to resolve matters of mutual concern. But this body has met only once in the past five years, and there is now some question whether it still exists.[3]

A new consultative group is therefore required, and I recommend—

2. **The Government of Canada should invite the Government of British Columbia to cooperate in establishing a Canada-British Columbia Fisheries Committee.**
    - i) **The committee's responsibility will be to assist the two governments in negotiating an intergovernmental fisheries agreement, to coordinate and oversee the implementation of that agreement, and to provide for consultations on other fisheries matters of mutual interest.**
    - ii) **The committee should consist of the Deputy Ministers responsible for fisheries in the two governments, who would act as alternate chairmen, and such other members as may be mutually agreed upon.**

In view of its structure and responsibilities, this committee should report to the two governments at the political level. To maintain momentum in the negotiation and consultative process (which may be difficult in view of the broad and divergent responsibilities and geographical separation of those directly involved) and to ensure that decisions are carried through, consideration should be given to the provision of a permanent coordinator for this committee.

CONCLUSION

The governments of Canada and British Columbia both have a major influence on the management of Canada's Pacific fish resources. Explicit and mutually agreed arrangements for reconciling their interests are overdue. The steps I propose in this chapter are intended to provide a framework for smoother and more effective means of coordinating their responsibilities and activities.

FOOTNOTES

[1] The Pacific Gillnetters Association, Exhibit #70, p. 4.

[2] A new federal interdepartmental Marine Resource Industries Development Steering Committee recently produced a policy paper (Managing the New Frontier: Towards A Pacific Marine Economic Development Strategy) calling for a strategic development of marine resources in British Columbia with participation by the province.

[3] D.D. Tansley, Deputy Minister, Department of Fisheries and Oceans, transcripts of the public hearings, Volume 67, pp. 13844-45.

CHAPTER 19

ADMINISTRATION

> *...government often attempts to do too many things for too many people at the cost of neglecting its most serious responsibilities, and government often attempts to under-finance and under-staff those most important elements of its mandate which often have a low political profile.*
>
> THE FISHERIES ASSOCIATION OF BRITISH COLUMBIA[1]

The government's success in fulfilling its mandate to manage fish resources and their use depends first on suitable legislation, regulations, policies and objectives; and second on the provisions for administering them. In this chapter, I address the latter. In particular, I am concerned with the Department's organization, financing and personnel.

Participants in the Commission's hearings expressed a wide range of views regarding administration of fisheries resources. Some saw administration as the main problem:

> We believe that the quality of the administration by the Department of Fisheries and Oceans is the most critical problem in the industry today. All other problems are not only secondary, but in many cases are the direct result of poor administration.[2]

Others thought that the government was doing as well as could be expected given insufficient funds and manpower, and the lack of long-range policy.

> With the funding, manpower, and mandate they are given, they do a commendable job of managing a very difficult industry.[3]

Many were complimentary and sympathetic to the Department's problems.

> ...almost all the staff of the D.F.O. with whom I consult are in my view, capable, well meaning and helpful. They absorb a great deal of misdirected abuse from the industry at large and still maintain cordiality and concern for our problems. It is my opinion that criticism of the D.F.O. are due to an absence of vision and long-term planning and not to the quality of the individual personnel employed there. The problem is compounded by the lack of political will to follow through with the good management initiatives when they do appear.[4]

Basic Responsibilities

The Department of Fisheries and Oceans acts as Canada's principal steward of fish resources and of the aquatic habitat on which they depend. The Department's responsibilities for fisheries and ocean science extend throughout the Canadian provinces, the northern territories and coastal waters. The Pacific region's responsibilities encompass Canada's entire Pacific coast, including offshore islands to the 200 mile limit, and the mainland of British Columbia and Yukon. Through international fisheries treaties, the Department is also involved in managing fisheries in extraterritorial waters in the Pacific and Arctic Oceans and in the Bering Sea. Administration of freshwater fish (including the anadromous steelhead and cutthroat trout) and fishing has been delegated to the Province of British Columbia, leaving the federal authorities responsible for all other fisheries resources and for commercial, Indian and recreational fishing in this vast area.

The Department's basic responsibilities are set out in the federal Department of Fisheries and Oceans Act, under which it is directed to administer a number of statutes.[5] On the Pacific coast, the most important of these are the Fisheries Act, Fisheries Development Act, Fish Inspection Act, Fishing Recreational Harbours Act, Coastal Fisheries Protection Act and the Fisheries and Oceans Research Advisory Council Act. In addition, the Department is involved in five international commissions on the Pacific: the International Pacific Salmon Fisheries Commission, the International Pacific Halibut Commission, the Inter-American Tropical Tuna Commission, the North Pacific Fisheries Commission and the North Pacific Fur Seal Commission. It also has a role in the Salmonid Enhancement Program, based on a federal cabinet order and a federal-provincial agreement, described in Chapter 5.

Organizational Structure

The Department is organized around six regions: the Pacific, Newfoundland, Gulf, Scotia-Fundy, Ontario and Western (the Prairie Provinces and Northwest Territories). Responsibilities for these regions are divided between two Assistant Deputy Ministers, one being responsible for Quebec and the Atlantic, the other for Ontario and western Canada including the Pacific region.

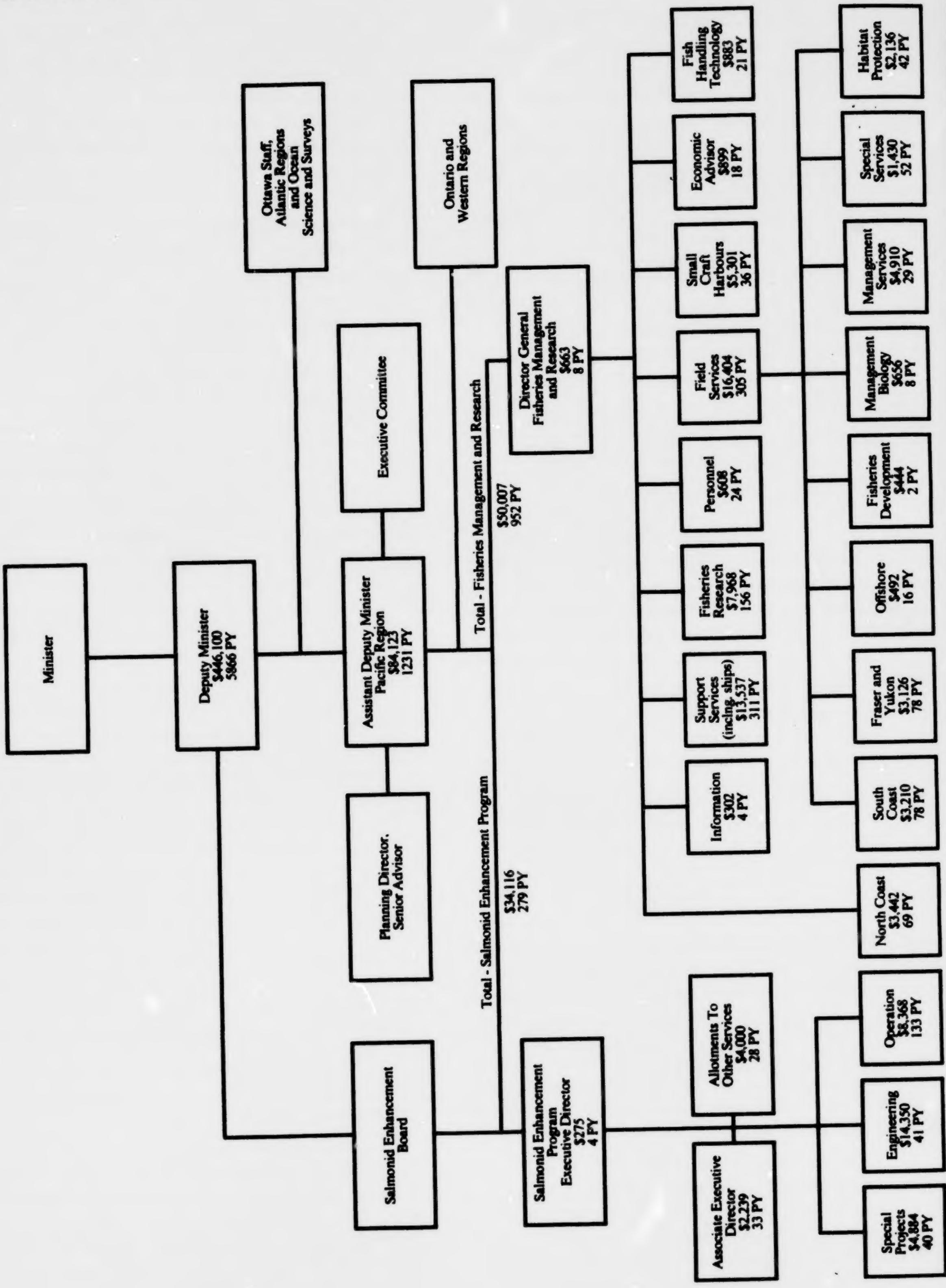

Minister
Deputy Minister $446,100 5866 PY
Ottawa Staff, Atlantic Regions and Ocean Science and Surveys
Ontario and Western Regions
Salmonid Enhancement Board
Assistant Deputy Minister Pacific Region $84,123 1231 PY
Planning Director, Senior Advisor
Executive Committee
Total - Salmonid Enhancement Program $34,116 279 PY
Total - Fisheries Management and Research $50,007 952 PY
Salmonid Enhancement Program Executive Director $275 4 PY
Director General Fisheries Management and Research $663 8 PY
Associate Executive Director $2,239 33 PY
Allotments To Other Services $4,000 28 PY
Special Projects $4,884 40 PY
Engineering $14,350 41 PY
Operation $8,368 133 PY
Information $302 4 PY
Support Services (inclng. ships) $13,537 311 PY
Fisheries Research $7,968 156 PY
Personnel $608 24 PY
Field Services $16,404 305 PY
Small Craft Harbours $5,301 36 PY
Economic Advisor $899 18 PY
Fish Handling Technology $883 21 PY
North Coast $3,442 69 PY
South Coast $3,210 78 PY
Fraser and Yukon $3,126 78 PY
Offshore $492 16 PY
Fisheries Development $444 2 PY
Management Biology $656 8 PY
Management Services $4,910 29 PY
Special Services $1,430 52 PY
Habitat Protection $2,136 42 PY

Figure 19-1 Department of Fisheries and Oceans, Pacific Region organization and resources in 1981-82
(budget figures in thousands of dollars; PY denotes person-years)

The ocean science and surveys component of the Department operates under a separate Assistant Deputy Minister more or less independently of fisheries in the Pacific region. The responsibilities of a fourth Assistant Deputy Minister include marketing, industrial policy and international matters.

The Pacific region is divided into two main organizational lines as shown in Figure 19-1, one for the Salmonid Enhancement Program and the other for Fisheries Management and Research. Operational policy in the region is coordinated through an executive committee consisting of the Assistant Deputy Minister responsible for the Pacific region; his senior advisor, the Director General; the Executive Director of the Salmonid Enhancement Program; and the Director of Regional Planning.

The development and functions of the Salmonid Enhancement Program are explained in Chapter 5. Its headquarters are in Vancouver, headed by an Executive Director, who is responsible to both the Salmonid Enhancement Board, chaired by the Deputy Minister, and to the Assistant Deputy Minister, who oversees the program's operations.

The structure of the other organizational line, Fisheries Management and Research, is much more elaborate. It is headed by a Director General, and has its headquarters in Vancouver. Its responsibilities are divided among three areas: the south coast; the north coast; and the Fraser River, Northern British Columbia and Yukon. These areas are subdivided into ten districts. In addition, there are several other line and functional support groups as shown in Figure 19-1.

The geographical distribution of the region's 1231 personnel is heavily weighted towards headquarters and staff functions as shown in Table 19-1. Headquarters units in Vancouver and Nanaimo employ 689 people, more than half the region's total manpower. Of the 542 employed in the field units, 230 were involved directly with fisheries management, including 125 fishery officers. The remaining 312 were assigned to various special services such as crewing on ships and operating enhancement facilities and small-craft harbours.

The allocation of the Department's national budget and manpower among regions in the fiscal year 1981-82 is summarized in Table 19-2. The total budget is approximately $450 million or 0.62 percent of total federal expenditures for departments and agencies. Fisheries, as distinct from ocean science and surveys, accounted for about 84 percent of the Department's total budget, and approximately 78 percent of its manpower requirements. The fisheries budget for the Pacific region, at $84 million in 1981-82, accounts for roughly one-third of all regional fisheries expenditures and almost a quarter of total fisheries' spending.

Table 19-1 Geographical distribution of personnel in the Pacific Region of the Department of Fisheries and Oceans, 1981-1982

	headquarters units total: 689				**field units total: 542**										
branch	**Vancouver**	**Technology Services Laboratory**	**Pacific Biologial Station Nanaimo**	**West Vancouver Laboratory**	**Kamloops**	**New Westminster**	**Nanaimo**	**Port Alberni**	**Campbell River**	**Victoria**	**Kitimat**	**Prince Rupert**	**Queen Charlotte City**	**Whitehorse**	**Total**
director general	8														8
information	4														4
economic and statistics	18														18
personnel	24														24
technology		21													21
special services:															
ships	7		27			19	4	8	11	81	13	24	11		205
other	62		41												103
field services	145				15	59	45	14	15	7	17	45	9	6	377
research	2	1	127	26											156
small craft harbours	7					14	5	2		1	1	5	1		36
salmonid enhancement program	151		13	5	4	24	21	10	19	2	7	18	5		279
total	428	22	208	31	19	116	75	34	45	91	38	92	26	6	1231

Source: Department of Fisheries and Oceans.

Table 19-2 Department of Fisheries and Oceans national allocation of budget and manpower, 1981-82

	manpower		budget	
	person-years	percent	millions of dollars	percent
Fisheries				
Headquarters	565	10	98.5	22
Regions				
Newfoundland	860	15	60.8	14
Gulf	200	4	29.7	7
Scotia-Fundy	1247	21	77.4	17
Ontario	123	2	9.0	2
Western	306	5	15.0	3
Pacific	1231	21	84.1	19
Ocean Science and Surveys				
Pacific region	298	4	17.2	4
Other regions and headquarters	1036	18	54.4	12
Total Fisheries and Oceans	5866	100	446.1	100

Source: Department of Fisheries and Oceans.

The pattern of budget and manpower allocations in the Pacific region is depicted in Figure 19-1. Of the region's $84 million budget for the 1981-82 fiscal year, wages and salaries account for $34 million, goods and services $30 million, and capital expenditures $20 million. About $50 million, or 60 percent of the region's budget, was allocated to Fisheries Management and Research. The remaining 40 percent of the budget ($34 million) was allocated to the Salmonid Enhancement Program. The Government of British Columbia contributed an additional $1.5 million to this program in that year.

Recent Turmoil

A striking feature of the Department has been its repeated attempts to reorganize, particularly during the past decade. In conjunction with frequent changes in senior personnel, this has produced an unstable administrative environment in the Pacific region.

Responsibilities for the fisheries of Canada rest primarily with the federal government. Traditionally, this national responsibility has been supported by a full-fledged Minister and Department. But in 1971 fisheries was brought under the awkward umbrella of a newly created Department of Environment, along with forestry, meteorology, wildlife, water and environmental protection.

Within the Department of the Environment, the Fisheries Service was headed by one of seven Assistant Deputy Ministers, but because of the wide variety of disparate agencies in this conglomerate department, fisheries suffered from a lack of focus and attention at senior levels. This shortcoming was recognized, and in 1975 a Minister of State for Fisheries was appointed to share responsibilities for the Department of the Environment. In addition, the position of Senior Assistant Deputy Minister was created to head the Fisheries and Marine Service.

Three years later, in 1978, a separate Department of Fisheries and Oceans was created, in effect reversing the decision made seven years earlier to consolidate fisheries with other areas of federal responsibility in the Department of the Environment. With this structure came the appointment of a Minister, a Deputy Minister and four Assistant Deputies, which we have today.

While these developments were taking place, the Ottawa headquarters of the Department was expanding and becoming more heavily involved in Pacific region decisions, with a corresponding dilution of influence by regional officials. Successive waves of structural change have led to an apparent preoccupation with internal administrative matters both in Ottawa and in the region. During this period three different individuals held the position of Director General (formerly called Director) for the Pacific region, each of whom made significant organizational changes during his tenure.

These changes did little to improve the effectiveness of the Department. As one participant noted —

> Re-organizations of management agencies have occurred with some regularity in response to changing circumstances. However, the organizational changes have done little to improve stock management and habitat protection. Furthermore, the institutional instability has resulted in the departure of significant numbers of Fisheries and Oceans staff including several well qualified fisheries biologists.[6]

The 1970s also saw the retirement of many fishery officers and professional staff who had been recruited from the armed forces after World War II. The influx of less-experienced replacement personnel added to administrative stress in the region.

These administrative disruptions came at a time when the Department's ability to manage the fisheries resources of the Pacific coast was being challenged by a number of important events. These included the extension of fisheries' jurisdiction from 12 to 200 miles, the development of the Salmonid Enhancement Program, the explosive emergence of the roe-herring fishery, a sharp increase in the catching power of fishing fleets, accelerating participation in sportfishing, new difficulties relating to the Indian fishery, and increasing public concern about environmental quality and protection of fish habitat. The resources of the region were tested as never before during a period of almost continual administrative upheaval and retrenchment. These events took their toll in loss of morale, staff turnover and strains within the Department, which inhibited the policy development needed to cope with the rapidly changing circumstances.

Present Deficiencies

Effective and efficient administration can be expected only when the administrators have clear policy objectives and an orderly framework of legislation and procedures for carrying out their responsibilities. At the outset of this report I noted that coherent objectives and policies for the Department are conspicuously lacking. This void is manifested in archaic legislation, ineffective licensing arrangements, conflicting programs and other deficiencies I have examined in other chapters.

Aggravating the general vagueness of policy is the widespread perception that administration itself lacks consistency and vigour, and that policy decisions are pliable in the face of lobbying and other pressures. Recurring examples of important decisions that are subsequently reversed or modified undermines confidence in the government's competence, invites partisan pressure from affected groups and demoralizes the public service. Weaknesses in enforcement, in statistical information, in the consultation process and simply in policy documentation, among other weaknesses identified in this report, all contribute to the impression of loose administration.

I must also call attention to an apparent unresponsiveness to urgent needs. Sometimes this is associated with administrative processes in the Pacific region, such as the failure to issue fishing licences by the time the fishing season opens. More serious is the inability of Ottawa headquarters and other government agencies to cope with the demands put on them. I have been informed that, because of delays in governmental procedures in Ottawa, local officials had to try to enforce regulations while lacking the legal basis for doing so. For instance, the freshwater sportfishing regulations for this year, prepared and administered by the Province of British Columbia but requiring federal formal approval, were submitted to Ottawa last year; but they were not approved, so had no legal force, until mid-July, halfway through the fishing season. Under these circumstances, the province's conservation officers must rely on bluffing or intimidating sportsmen into complying with them.[7]

Furthermore, while I acknowledge the need for controls and sometimes burdensome procedures in a large government, I must still conclude that in some cases the procedures prevent the government from attending to the tasks it has set for itself. For instance, simple changes in fishing regulations involve cumbersome and time consuming procedures. And designing and implementing amendments to section 33 of the Fisheries Act took more than four years. The result of such cumbersome processes is a slow, unresponsive and unbusinesslike administration, though this may not be the fault of those in the front line of responsibility.

These are difficult issues for an external Commission to deal with because they call for an appreciation of functional relationships within the broad framework of the public service. This can only be obtained by means of a thorough review of administrative processes, lines of responsibility and financial resources. The remainder of this chapter examines some broad concerns that have been brought to my attention and suggests some steps toward improving the administrative system. Some important related matters are dealt with elsewhere in this report, such as recommended changes in legislation and licensing, measures to reconcile provincial and federal responsibilities, provisions for enforcement, and changes in management, research and consultative arrangements.

TOWARD MORE EFFECTIVE ADMINISTRATION

Strengthening Representation in Ottawa

Some participants in the Commission's hearings suggested that a special Minister of Fisheries for the Pacific be appointed on grounds that, although Fisheries and Oceans is a relatively small department, it has more direct contractual links with individuals and firms through licensing than almost any other federal department, and so calls for continual attention from the Minister. Moreover, the circumstances of the Pacific coast are so different from those of the Atlantic and other regions that it is unreasonable to expect one person to attend adequately to all.

While these arguments have some force, I cannot recommend two (or more) Ministers of Fisheries and Oceans within the federal government. With the whole Department accounting for less than one percent of the federal spending by all departments, and only 1.6 percent of the public service, it does not, realistically, justify more than one Minister. Such a situation would also give rise to questions about responsibility to Parliament for general fisheries policy, legislation, budgets and administrative arrangements in Ottawa. Nor do I recommend more than one Deputy Minister for Fisheries and Oceans, since that would almost inevitably generate conflict, competition and biases. I have concluded that the present structure, with one Minister responsible for Fisheries and Oceans for Canada, one Deputy Minister, and geographical responsibilities divided at the Assistant Deputy Minister level, is appropriate.

But certain improvements can be made. One is in the geographical location of the Assistant Deputy Minister responsible for the Pacific region. This senior official was recently moved to Vancouver on an experimental basis, though the Minister, Deputy Minister and the three other Assistant Deputy Ministers are all stationed in Ottawa.

This arrangement has apparently left a void in the representation of the Pacific region in Ottawa, thereby aggravating the problem it was intended to alleviate[8] and confusing lines of responsiblity in Vancouver. I therefore recommend that —

1. **The office of the Assistant Deputy Minister for the Pacific region should be located in Ottawa.**

Elsewhere, I recommend other measures to focus Ottawa's attention on, and facilitate its management of, Pacific fisheries. I suggest legislative changes in Chapter 21 that would give the Pacific region's Director General greater responsibilities and flexibility in managing the fisheries. I suggest in Chapter 20 that the Yukon fisheries might be better served if responsibility for that territory were shifted from the Pacific to the Western region. This would leave the Pacific region's attention focused on British Columbia. And in Chapter 18 I propose a framework for cooperation between the provincial and federal governments.

Regional Priorities

Some of the concern about the Pacific region's representation in Ottawa is rooted in the view that this region receives lower priority than the Atlantic at the political and senior bureaucratic levels. Several factors could contribute to such a situation: fishing is a much more important component of the regional economy of the Atlantic than of the Pacific, fishermen earn lower incomes and have fewer occupational alternatives; the Atlantic regions have five provinces with keen interests in fishing, each with its own Minister of Fisheries, while the Pacific region consists of one province with no such specialized minister; and many more Members of Parliament come from Atlantic constituencies. In addition, subtle historical factors and political traditions keep Atlantic fishermen in closer communication with politicians and fisheries administrators in Ottawa.

Table 19-3 The Pacific Region's share of the Department's manpower and budget[a]

	including Salmonid Enhancement Program[b]		excluding Salmonid Enhancement Program[b]			
					percent increase since 1969/70	
	percent of manpower[c]	percent of budget	percent of manpower[c]	percent of budget	manpower	budget
Headquarters (Ottawa)	13	26	14	29	40	980
Pacific Region	27	23	22	15	11	250
Other Regions	60	51	64	56	35	600

[a] Excluding Ocean Science and Surveys.

[b] Budgeted allocations for the fiscal year 1981/82.

[c] In person-years.

Source: Department of Fisheries and Oceans.

This view about priorities was confirmed at my public hearings by Members of Parliament and public servants.[9, 10] Statistical indicators also tend to support it. Table 19-3 shows that during the last fiscal year the Pacific region received less than one-third of the regional manpower and fund allocations including those for the Salmonid Enhancement Program. Excluding the latter, the Pacific received only about 15 percent of the regional budget allocations, and other regions and headquarters have received much larger increases during the last twelve years. In at least one Atlantic province the expenditures on fisheries have been estimated to be more than the total value of landings.[11]

These figures do not in themselves prove a misallocation of resources among regions; resources should be distributed according to needs and potential benefits. Nonetheless, other facts support that conclusion: the region accounts for more than a quarter of the total value of Canada's commercial fish production and most of the sportfishing administered by the Department; its geographical area of land and water is larger than those of the four Atlantic provinces combined, and much of it is remote and inaccessible; its resources are, for the most part, much more demanding in terms of day-to-day management and habitat protection requirements; and in contrast to marine stocks elsewhere that are managed for their natural yields, Pacific salmon and some other species afford much greater opportunities for increased production through improved management, research and production.

For these reasons, I am concerned about the provisions for the Pacific region. I hasten to add that I have not been instructed to review Canada's nation-wide provisions for fisheries administration, which is the context within which such judgements must be made. I therefore recommend that —

2. **The manpower and financial resources provided to the Pacific region relative to other regions, and to the Ottawa headquarters of the Department, should be thoroughly assessed in the context of a financial and administrative review of the Department (described below).**

Organization Within the Region

The Pacific region, has experienced a long history of oscillation between centralization and decentralization.

Until the 1950s, most administration was in the hands of three district offices with a small coordinating group in the Vancouver headquarters. Then a process of centralization began in Vancouver as professional biologists, engineers and economists were recruited to deal with proliferating technical problems. In 1970 this trend was reversed by formal decentralization of fisheries management responsibilities into two offices, one for the north and another for the south. A renewed drift toward centralization followed, but today the trend is again in the direction of decentralization, especially with respect to fisheries management and habitat protection. In addition to the north area office based in Prince Rupert and the south area office in Nanaimo, a third area office in New Westminster is responsible for the Fraser River and northern rivers flowing through the Alaskan panhandle and the Yukon Territory. The headquarters office in Vancouver is responsible for offshore fisheries.

The three area managers are not responsible for all activities in their geographic areas. They manage salmon, herring and shellfish, but groundfish and offshore fisheries are managed from Vancouver. Habitat management is being decentralized apart from a small group of specialists to be retained in Vancouver. The Salmonid Enhancement Program (apart from the geographic working groups) is managed mainly from Vancouver headquarters, as are research, support services, information services, small craft harbours and international matters.

In retrospect, the frequent organizational changes of recent years appear to have been *ad hoc*, with insufficient attention to their impacts on the Department as a whole. Examples in addition to those noted above are the separate structure for the Salmonid Enhancement Program, moving the Assistant Deputy Minister from Ottawa to Vancouver, and the shifting of research responsibilities back and forth between the Fisheries Research Branch and other branches.

I am loath to recommend any major reorganization of responsibilities within the region at this time for three reasons. One is that the Department's personnel are weary of continuous reorganization, and have spent so much energy in the process that I consider it important to minimize dislocative changes, especially in view of all the other policy changes I have proposed. The second is that a gradual decentralization of responsibilities to area offices is now taking place, and this trend appears to be in the right direction. The third is that changes in Departmental organization should be considered in the context of a complete budget and efficiency review, which I recommend below.

Rather than major organizational changes, the emphasis, for the time being, should be on strengthening the Department's capabilities, re-aligning priorities, streamlining procedures, improving the qualifications of personnel, building up weak services, and improving information and planning.

Notwithstanding my reluctance to recommend reorganization, I believe a few changes are urgent and can be made without causing disruption. One is the appointment of a senior officer to assist the Director General. Clearly, the Director General now carries too many responsibilities single-handedly. This is partly illustrated in Figure 19-1, which shows the wide range of functions he must attend to. In addition, he must cope with the heavy external demands of representations from fishermen, processors, the provincial government and his superiors in Ottawa. Even with extraordinary energy, these pressures leave little time to attend to internal operations, budgeting, staffing and administration. I therefore recommend that —

3. **An Associate Director General should be appointed to assist the Director General of the region, especially in respect of internal operations and administration.**

This proposal is consistent with the findings of a recent review of the Support Services Branch, which noted the exceedingly heavy and diverse demands on the Director General.[12]

Some recommendations in other chapters have significant implications for administrative organization. They include those relating to the further strengthening and decentralizing of habitat management personnel (Chapter 3); transferring responsibility for the pollution control provisions of the Fisheries Act from the Department of Environment to the Department of Fisheries and Oceans (Chapters 3 and 18); improving licensing administration (Chapter 8); strengthening enforcement capabilities (Chapter 16); and improving consultative arrangements (Chapter 17).

Financial and Administrative Review

The administrative organization and support for the Department needs to be critically reviewed on a national basis and with attention to organizational detail. Such a review calls for a different kind of investigation from that undertaken by this Commission, one like the Zero A-Base Budget Review of all programs in Environment Canada initiated in 1977, when fisheries was the responsibility of that department. That review set out to assess priorities, to identify inefficiencies and duplication of functions, and to evaluate expenditures in terms of their benefits. It was deferred for the Pacific region because of a reorganization taking place there at the time; and when the Department of Fisheries and Oceans was created, the review was put in abeyance for the rest of the Department as well. Except for an internal review of the Support Services Branch last year, no thorough review of the Department has ever been undertaken. This is now overdue, and I recommend that-

4. **The government should initiate a thorough zero-base review of the administration, staffing and financial support for each program of the Department.**

Properly conducted, such a review would throw light on my concerns and those raised by others about the Department's organization and internal management, and would meet the needs expressed by the recent Royal Commission on Financial Management and Accountability.

> The defects in financial administration and control among federal departments, which have been so starkly portrayed by the Auditor General, can be seen as a direct consequence of the absence of any requirement to provide a proper accounting of the carrying out of the management role. . . .
>
> Over the course of the past few years, several new financial measures for improving management efficiency have been developed and applied to a limited extent within government, including cost-benefit anaylsis, program planning and budgeting, operational performance measurement, and management by objectives. The contribution of each of these has been limited because, in the absence of any requirement for departments or agencies either to manage their affairs effectively or to demonstrate to the Government and Parliament that they were doing so, there has been little pressure to apply such techniques rigorously.[13]

The proposed review shall therefore follow the zero-base approach to ensure that each program is evaluated in its entirety with reference to predetermined objectives and priorities. This provides an opportunity to assess and reorient the established uses of administrative resources, which otherwise tend to be perpetuated by the traditional governmental budgeting procedure of making annual incremental adjustments to existing expenditure patterns. The review should include the whole Department, not just the Pacific region. It should identify, among other things, the requirements for new priorities and programs arising from this Commission. It should be conducted by a group that includes one or more senior officers of the Department, but the majority should be non-Departmental, such as specialists from Treasury Board, the Office of the Comptroller-General and perhaps a private consultant. This kind of review has been carried out in other departments, apparently with considerable benefits.

Specific issues that have been brought to my attention and warrant investigation in the context of this review are the following:

i) The balance of manpower and financial support devoted to the Pacific region in relation to other regions and headquarters, as discussed earlier in this chapter.

ii) Whether Yukon fisheries administration would be better served if that territory were included in the Western region or the proposed Arctic region and, if it is to remain in the Pacific region, whether it should be part of the north coast or Fraser River area administration.

iii) The separate reporting line for the Salmonid Enhancement Program, the administrative structure of that organization, and its working relationship with the Department's habitat management group.

iv) The unique reporting line for the manager of the north coast area (i.e. directly to the Director General rather than through the Field Services Branch like the other area managers).

v) The geographical division of research activities among the Environmental Institute at West Vancouver, the Fisheries Technology Laboratory in Point Grey, and the Pacific Biological Research Station in Nanaimo. These facilities have not been integrated as once planned, and there may well be opportunities for significant savings through merging libraries, facilities and administration.

vi) The adequacy of fishery officer, enforcement officer and community advisor personnel and the appropriateness of their reporting lines.

vii) The special deficiencies and problems of the Support Services Branch identified by a review team last year, including deficiencies of direction, communication and management of supplies.[14]

viii) The policy favouring external consultants and contractors rather than in-house resources for management, enforcement and other functions.

My investigations have left me with the impression that the economy and efficiency of the Department's activities could be improved signficantly. However, only a specialized internal review of the kind proposed could substantiate that impression and identify opportunities for improvements. Properly conducted, with the participation of Departmental personnel, such a review can be completed without impairing the Department's ability to cope with the heavy demands of policy changes in the meantime.

Personnel Training and Development

To properly carry out its diverse responsibilities, the Department needs a variety of specialized staff. Many of these specialists are employed widely in the public and private sectors — engineers, accountants, computer technicians and administrative support staff — and can be recruited from a large pool of qualified people. Others, especially in the fields of fisheries research, management and enforcement, require expertise not widely employed elsewhere. The Department must therefore make a special effort to ensure that adequately trained personnel are available.

The most lengthy and advanced training is required by fisheries research scientists. Many universities in Canada and elsewhere offer the post-graduate degree programs needed for these positions. And even more universities, including three in British Columbia, offer bachelor degree programs of the kinds needed by the fisheries biologists, biochemists and other specialists required by the Department. Most universities offer post-graduate programs in natural resource studies that can accommodate requirements for advanced training in fisheries.

However, deficiencies exist at two other levels. One is in training programs for technical support staff such as fishery officers, enforcement officers and technicians; the other is in professional training for fisheries managers.

As I explain in Chapter 16, the fishery officers are the Department's front line presence in the field, and their responsibilities in resource management call increasingly for specialized training. Yet in a review earlier this year, the Director of National Enforcement in Ottawa reported as follows:

> Generally speaking, there is very little consistency in the type of training afforded the fishery officer recruits across the country. By and large there is very little formal training, the exception being the extensive recruit training program provided by Scotia-Fundy and Gulf Regions and the Law Enforcement Training, adopted by some regions and provided by RCMP, Regina. Most regions, following a short orientation program (2 to 3 weeks) provide the recruit with "on-the-job" training only, generally conducted by local supervisory personnel, who in many cases are not qualified trainers. In more recent years, some regions have provided workshops and some training in specialized areas, but by and large the programs now in effect are either unsatisfactory or do not go far enough.[15]

I find it alarming that none of the colleges and institutions in British Columbia provide adequate educational programs for fishery officers (though Malaspina College is developing a program in fish culture, and the British Columbia Institute of Technology is developing a general resource management option). This contrasts sharply with the number of technical training programs available in forestry, wildlife and other natural resource fields. As a result, most of the Department's recent recruits have been trained in institutions in the prairie provinces or Ontario, with obvious implications for their familiarity with Pacific fisheries and the relevance of their specialized knowledge. I therefore recommend that —

5. **The Department should cooperate with one of the colleges or technical training institutes in British Columbia to design and establish a training program suitable for preparing fishery officers and technicians.**

Cooperating with the British Columbia Fish and Wildlife Branch and other potential employers of fisheries technicians might also be fruitful. The program could be adapted to upgrade the training of experienced staff as well as new recruits.

Eventually, a well-rounded technical training program could provide the basic training for fishery officers, and for enforcement officers who would then undertake the additional special training in enforcement.

A recent study sponsored by the Department pointed to the dearth of training programs of this kind in the Pacific region and suggested a two-year program with options for technical training in fish management, habitat management, fish culture and related fields.[16] This study and its detailed proposals offer a foundation for designing and implementing one or more programs that would close a significant gap in training facilities for fisheries personnel.

To train the specialized enforcement officers described in Chapter 16, I recommend that —

6. **The Department, in cooperation with the R.C.M.P. training school in Regina, the Justice Institute of British Columbia or other appropriate institutions, should support the development of a strengthened enforcement training program for fishery enforcement officers.**

The study of fishery officer staffing referred to above identifies a number of related problems in recruitment and career development. These should be considered in the context of the budget and efficiency review of the Department proposed earlier.

The second deficiency — the lack of supplementary training for professional fishery managers — is equally urgent. With time, fisheries management will increasingly demand professional training. University degree programs offer the requisite scientific preparation, but they do not prepare people for the operational management of fisheries: I refer to the techniques of assembling data, analyzing stocks and catch statistics, and interpreting the results in order to make proper management decisions. To meet this need, I recommend that —

7. **The Department should cooperate with one or more of the universities in British Columbia in designing and offering a non-degree program in fisheries management for training the Department's personnel.**

An embryonic program of this kind has been tested at the University of British Columbia's Institute of Animal Resource Ecology, where advanced data processing and computer technology are available. Although the experiment has been highly successful a stronger commitment would be needed from the Department to enable this or a similar program to be successful on a continuing basis.

The resource management program would provide professional training for biologists and perhaps also fishery officers who had sufficient preparation.

Planning

Throughout this report I have emphasized problems that flow from unclear policy objectives, vague priorities, a lack of evaluation and accountability and the absence of forward planning. The results are uncertainty and frustration within the fishing community, confusion and demoralization within the public service and inefficiencies within fisheries administration. This must be rectified. I concur completely with the Royal Commission on Financial Management and Accountability that —

> The institution of sound management must begin with the establishment of goals and the assignment of relative priorities to them through the allocation of resources.[17]

Policy development and coordination in the Pacific region is ostensibly in the hands of the executive committee, and I understand that a senior official has recently been designated as a planning director. But any deliberate forward planning process now appears to be overwhelmed by more immediate pressures; so it does not steer the allocation of manpower and budgets, nor does it permeate the administration in any significant way. In order to correct this situation, the Department needs, in the Pacific region, an on-going planning process to develop policies, set objectives, make forecasts, design programs and budgets and evaluate the results. I therefore propose that —

8. **The Department should designate a policy and planning group, consisting of senior officers, with specific responsibility for strategic long-range planning for fisheries management and administration in the region.**

The purpose of this recommendation is to replace the present reactive stance of the Department with a forward-looking one that deliberately pursues explicit objectives. If this planning body is given the status it warrants, and if it consults and communicates adequately through mechanisms I discuss in Chapter 17, it could do much to overcome the uncertainty and drift that seems to have characterized administration in the past, and to give direction to the allocation of public resources.

FOOTNOTES

1. The Fisheries Association of British Columbia, Exhibit #63, p. 34.
2. Pacific Coast Fishing Vessel Owner's Guild, Exhibit #194, p. 1.
3. The Pacific Gillnetters Association, Exhibit #70, p. 5.
4. T. Northcott, Exhibit #86, p. 2.
5. Revised Statues of Canada, 1979, C 42.
6. Association of Professional Biologists of British Columbia, Exhibit #96, p. 3.
7. The Province, Vancouver, July 6, 1982, p. 1.
8. D.D. Tansley, Deputy Minister, Department of Fisheries and Oceans, transcript of the public hearings, Volume 67, pp. 13899-13902.
9. J. Fulton, MP, transcript of the public hearings, Volume 48, p. 9825.
10. D.D. Tansley, Deputy Minister, Department of Fisheries and Oceans, transcript of the public hearings, volume 67, p. 13869.
11. R.D.S. Macdonald, Fishermen's Income, and inputs and outputs in the fisheries sector: the P.E.I. case, Canadian Issues, Volume 3 No. 1, Spring 1980. pp. 25-35.
12. Department of Fisheries and Oceans, Support Services Review, September 15, 1981.
13. Royal Commission on Financial Management and Accountability, Final Report. Ottawa, March 1977. p. 27.
14. Department of Fisheries and Oceans, Support Services Review, September 15, 1981.
15. Preliminary Report on a Fishery Officer Career Plan in the Department of Fisheries and Oceans. Ottawa, May 21, 1982. p. 7.
16. C.W. Chestnut, "Study of Opportunities for Cooperation to Meet Pacific Fisheries - B.C.I.T. Mutual Interest in Training and Placing Graduates." Prepared for the Department of Fisheries and Oceans, 1981.
17. Royal Commission on Financial Management and Accountability. Final Report. Ottawa, March 1979. p. 31.

Part VI

Yukon

CHAPTER 20

YUKON FISHERIES

> *. . .the fishery is one of the best on the continent, with a variety of species, numerous accessible fishing sites, good return for effort and minimum regulation. Uncontrolled resource use will change this situation.*
>
> YUKON CONSERVATION SOCIETY[1]

In the preceding chapter I explained that Yukon fisheries are administered as part of the Department of Fisheries and Oceans' Pacific region. The problems the Department faces in this territory, and the framework within which it operates, are quite different from those in British Columbia, however. And the political and jurisdictional arrangements differ substantially from the rest of the Pacific region. These unique circumstances have required me to undertake a special investigation of fisheries policy as it applies in Yukon. Some of my recommendations in other chapters apply to the whole Pacific region; in this Chapter I summarize my particular conclusions about Yukon arrangements.

THE FISH RESOURCES

The fish resources of the Yukon Territory have not been systematically surveyed, and hence our knowledge about them rests on various investigations into particular problems. Many of these studies were carried out by agencies other than the Department of Fisheries and Oceans, and they comprise a patchwork of field inventories, compilations of catch statistics, surveys of fishermen, and monitoring studies associated with development projects.

Generally, the freshwater fish stocks in Yukon lakes are not highly productive. Low concentrations of nutrients, low temperatures and short ice-free seasons result in slower growth rates, longer periods of maturation, and less frequent spawning than at lower latitudes. In Yukon rivers the productivity of fish stocks is believed to vary considerably, but information is scanty.

Both freshwater and sea-run (anadromous) species are important in Yukon, and they are utilized in commercial, sport, and subsistence fisheries. All five species of Pacific salmon use the Yukon River system, which is one of the most productive on the coast. This great river connects extensive inland spawning and rearing streams with the ocean, where salmon spend most of their lives. So, unlike freshwater stocks, their productivity is not retarded by the harsh Yukon climate. Chinook and chum are fished along the main stem (and tributaries) of the Yukon River, which flows through Alaska and empties into U.S. territorial waters in the Bering Sea. Sockeye, chinook and coho are fished in the Alsek-Tatshenshini system but pink salmon are rare. Runs of salmon are found in the Liard and Mackenzie rivers also.

Other anadromous species, such as steelhead trout, are found in small numbers in the Tatshenshini River. Arctic char and dolly varden are anadromous in some locations and landlocked in others.

Much more important are the freshwater species. Grayling are widely distributed in lakes and streams and highly sought by fishermen. Lake trout and three species of whitefish dominate catches in the lakes. Other significant species are northern pike, turbot, and rainbow trout which have been introduced to a few areas.

The fragmentary evidence available on the condition of Yukon fish resources suggests that stocks of the principal species are declining. Lake trout and grayling appear to be the most seriously depleted. The main cause of depletion is believed to be overfishing, with habitat damage being a contributing factor in some areas. Little is known about the condition of the salmon stocks using Yukon rivers, because their distribution and abundance in Yukon is poorly documented and data on their contribution to ocean commercial fisheries is weak. The dearth of resource information makes it hazardous to draw any broad conclusions about stock sizes or trends.

THE FISHERIES

Until 1954 the regulation of fishing in the territory was rudimentary, and no licences were required for sportfishing. In that year, regulations provided for sport, commercial and domestic licences. Subsequently, provision was made for Indian food-fishing certificates as well. These four licensing systems continue to accommodate distinct fisheries.

The Sport Fishery

In 1980 just under 17 thousand sportfishing licences were sold by the Yukon Territorial Government, as shown in Table 20-1. Allowing for unlicensed anglers under 16 years of age, nearly 20 thousand sport fishermen fished in Yukon waters in 1980.[2] This year licence fees were raised and new categories were introduced for resident fishermen over 65 years of age and for one-day non-resident fishermen.

Table 20-1 Sportfishing licences in Yukon

	fee in 1982	number of licences sold in 1980
resident of Canada	$ 5.00	10,987
resident over 65 years	0	n.a.[a]
nonresident: season	20.00	2,343
5 day	10.00	3,503
1 day	5.00	n.a.[a]
total sales		16,833

[a] New licence category introduced in 1982.

Source: Yukon Territorial Government.

The sport fishery is dominated by residents of Canada, well over half of them being residents of Yukon. They buy almost two-thirds of the licences and account for three-quarters of the estimated 170 thousand angler days of fishing in 1980.[3] Probably 80 percent of their total catch is taken by 20 percent of the fishermen.[4]

Many sport fishermen from other countries are attracted to the territory by the excellent trophy fishing opportunities and remote fishing lodges. But the majority of nonresident fishermen fish casually while visiting Yukon for other reasons.

Spending of about $4.2 million was attributed directly to sportfishing in the territory in 1980; of this, $1.4 million was spent by nonresidents.[5] As Table 20-2 shows, the sport catch is estimated to have been 170 thousand fish in 1980,[6] and this probably accounts for more than 95 percent of all fish caught (though data on all fisheries is very weak). Grayling accounted for nearly half the total sport catch, and lake trout and northern pike for another third. Salmon and other trout accounted for 12 percent, and the remainder consisted of whitefish, char and other species.

Table 20-2 Estimated catches in Yukon[a]

	sport (thousands of fish)[b]	commercial (thousands of pounds)[c]
grayling	83	0
lake trout	38	10
northern pike	21	0
whitefish	4	17
salmon	14	204[d]
other	10	1
	170	232

[a] Excluding catches in the Indian and domestic fisheries. These 2 fisheries accounted for annual catches of salmon of about 187 thousand pounds and 46 thousand pounds, respectively, in recent years. Catches of other species are believed to be small.

[b] Estimates for 1980.

[c] Rough estimates of average annual catches during the 5-year period 1977 to 1981.

[d] Dressed weight.

Sources: "1980 Survey of Sportfishing in Canada, Preliminary Results." Prepared for the Department of Fisheries and Oceans, 1981; Annual Narrative Reports, Department of Fisheries and Oceans, Whitehorse.

Sportfishing activity shows certain conspicuous patterns that have important implications for policy. First, it has been growing rapidly. During the 1970s licence sales almost doubled. Second, sportfishing is heavily concentrated on the few lakes and streams accessible by road. Third, it is highly seasonal; nearly 80 percent of the fishing takes place during summer months, and winter fishing is limited mainly to ice fishing on lakes by local residents. Fourth, while sportfishing activity has been increasing rapidly, average catches have been declining sharply. A recent study suggests that the rate of harvesting has already exceeded sustainable yields in many of the more accessible lakes where fishing is concentrated, and stocks have been declining.[7]

Another concern is the increasing pressure on certain remote lakes from fly-in sportfishing operations, which are an important adjunct to the tourist industry promoted by the Yukon government. These operators concentrate pressure on particular stocks in lakes of low productivity, and when catch rates decline they move on to other lakes, leaving depleted fish stocks. So far, this problem has not been well documented, however.

Responsibility for managing sportfishing is divided. The Yukon government, through its Department of Renewable Resources, administers sportfishing licences. The federal Department of Fisheries and Oceans is responsible for designing and enforcing fishing regulations, although the enforcement authority is shared with conservation officers of the Territorial Wildlife Branch. The main management tools are gear restrictions and daily and seasonal bag limits, which apply uniformly throughout the territory. Certain limits and closures have been applied to particular areas of special interest or sensitivity, though these measures are not authorized by the present regulations.

With only a small staff in the huge territory, enforcement is a difficult task; consequently, the Department relies heavily on undiscriminating regulations for the whole territory. Inevitably, in the divergent circumstances of Yukon fisheries, these regulations are inadequate to protect heavily fished stocks in certain areas, and are unnecessarily stringent in other areas, causing irritation among sport fishermen and consequent problems of compliance and enforcement.

The Commercial Fishery

Both anadromous and freshwater species are commercially fished in the territory. Chinook and chum salmon are taken in the Yukon River, mainly near Dawson and further downstream. During the 1970s an average of 3,800 chinook and 4,000 chum salmon were taken annually. The salmon are marketed locally, fresh or frozen.

Even if the stocks allowed larger catches, expansion of this industry is constrained by the small size of the local market and the incapability of processing plants to produce products of sufficiently high value to justify transport to external markets.

A new commercial venture has recently been established by native groups, with support from the federal Departments of Regional and Economic Expansion and Indian and Northern Affairs, for processing fresh and frozen salmon and marketing it in Yukon and British Columbia. Some anxiety has been expressed about additional pressure on stocks that could result from this operation.

Commercial fishing for freshwater species, primarily lake trout and whitefish, is authorized on 20 Yukon lakes. As in the salmon fishery, markets for the products have been unstable and uncertain. Table 20-2 shows the size and composition of commercial catches in recent years.

Commercial fishing licences are issued annually at a fee of $25, and specify the location of fishing, the species to be taken, and the time and method of fishing authorized. The number of licences issued for salmon fishing in the Yukon River has been limited since 1980 in the interests of conservation. In that year nontransferable licences were issued only to those who fished in any of the preceding three seasons. In the 1981-82 licence year, only 39 were issued.

Within the Yukon River, management of the salmon fishery has been orderly. The commercial fishery generally operates six days a week when the salmon are running in the rivers, but the number of days may be curtailed if the runs appear low, as was the case for chinook salmon this year.

The number of commercial fishing licences for freshwater species is not limited. Fifty licences were issued in 1981 and I understand the number increased sharply this year. For each lake in which commercial fishing is authorized, an annual quota is fixed according to a somewhat arbitrary productivity estimate of approximately one-half pound per acre of lake per year. When the quota has been reached, the lake is closed to both commercial and domestic fishing (discussed below). The total quota for all commercial fishing lakes is 145 thousand pounds of whitefish and 73 thousand pounds of lake trout. Current landings are only a fraction of the quota, but production is spread very unevenly over the various lakes. Some are fished to their quotas regularly, while others are untouched or only lightly exploited.

Domestic Fishing

Domestic fishing licences are issued annually to people other than Indians at a fee of $10 to authorize them to take fish for their own food requirements. These licences, like commercial licences, specify the location of fishing, the species to be taken, and the time and method of fishing authorized. In 1981, 47 domestic licences were issued for salmon fishing, and 76 for freshwater species. This fishery is believed to account for only about one percent of the total catch in the territory.

The domestic fishery is managed flexibly to accommodate varying needs and circumstances. In southern Yukon, where concerns about declining stocks and competition with the sport fishery are most acute, domestic fishing has been confined in recent years to lakes with commercial quotas, and the domestic catch is subject to these quotas. Elsewhere domestic fishing is permitted at the discretion of fishery officers.

Indian Food Fishing

> Fishing has always been and remains today an integral component of Yukon Indian culture.[8]

In recognition of their traditional dependence on fish, certificates are issued without charge to Indians to authorize them to take fish for food. In 1981-82, some 204 certificates were issued, but this undoubtedly represents only a fraction of the number of Indians who engage in this fishery, because most are unaware of, or do not comply with, the requirement. Certificates authorize fishing for both salmon and freshwater species, but no reliable information is available on the catch taken. Only recently has an attempt been made to estimate catches.

Management of Indian fishing relies mainly on suggestions of fishery officers to constrain harvests where this is felt to be necessary. While the total catch is believed to be modest, some controversy has developed over competition between Indian and sport fishermen for salmon in the Klukshu-Tatshenshini river system.

Last year, the Council of Yukon Indians and the federal government negotiated an agreement-in-principle for Indian fishing. This provides a framework for a final agreement to be reached within two years. According to testimony presented at this Commission's hearings, the agreement will call for substantial changes in the management of the Indian fishery, requiring that certain rights to fish be defined quantitatively, that priorities be assigned among fisheries and that Indians have the opportunity to participate in commercial fisheries.[9]

Once in effect, this agreement will provide for consultation with Indians in the development of Yukon fisheries policy. This will require improved information about the stocks and their yield capabilities, consistent monitoring and catch information, and closer consultation with other fishing interests.

Needed Improvements in Fisheries Management

In many respects the regulatory framework for managing Yukon fisheries is well developed, and is considerably more advanced than the arrangements for ocean fisheries in the rest of the Pacific region. Licensing systems are well established for all of the fisheries, and the variety of these appears to be sufficient to accommodate the special needs of the territory.

In the commercial salmon fishery, entry is controlled, as are the commercial catches. The main challenges facing salmon management lie at sea, outside the territory, where U.S., Canadian and Japanese commercial fleets catch salmon destined for Yukon. To a large extent escapements are beyond the control of fisheries managers in the territory. As a result of preponderant American involvement, solutions to many management problems hinge on Canada's international agreements with the U.S., which are beyond this Commission's terms of reference.

In the other commercial fisheries, as in the domestic fishery, licences provide for close control. And the imminent agreement with Yukon Indians will allow them to take better advantage of economic opportunities in the fisheries. In view of the advanced stage of these negotiations, I make no recommendations on this matter.

But there are nevertheless significant deficiencies that must be corrected in order to properly conserve and manage the valuable fish resources of the territory. The most conspicuous of these is the paucity of information about the resources themselves — their size, distribution and yield capabilities — which is a serious obstacle to managing fisheries.

> So little is known about basic biological values of the lakes and rivers and the fish species they produce that knowledgeable management decisions cannot be made.[10]

This deficiency of information must be alleviated to enable the Department to meet its basic responsibilities for conserving and managing the stocks. Later, I point to a need for this information in connection with habitat protection as well. And under the expected agreement with Yukon Indians, this need will be even more urgent.

I therefore recommend —

1. **The Department should immediately initiate a systematic inventory of the fish resources in Yukon, giving priority to the lakes and streams subject to heaviest fishing pressure.**

This program should aim at identifying the size and condition of the stocks and their yield capacities. The survey should be carefully planned over a period of years and coordinated with the compilation of catch statistics and other information using modern data processing techniques. This information will enable, among other things, more reliable determinations of commercial quotas.

The second conspicuous shortcoming of Yukon fisheries management is the imbalance between the distribution of fishing pressure and the resources available. Many lakes and streams are very lightly fished, while those in the more accessible areas appear to be overexploited. Because the stocks in the territory are so sensitive to fishing, it is particularly important to ensure that the pressure of harvesting is not permitted to exceed the sustainable yield of the stocks in each lake or river system. If the Department fails in this, the resources will be depleted and the unique fishing opportunities of the territory will be eroded.

The direction of needed reform is clear. The Department must rely less on across-the-board regulations and more on discriminating management controls to meet the needs in varying circumstances. Accordingly, I recommend —

2. **The Department should progressively adopt more discriminating fishing regulations and management techniques to take account of the particular conservation requirements of individual lakes and river systems and to maintain a diversity of fishing opportunities.**

These measures could include specific provisions for particular lakes, relating to access, size and bag limits, and permitted gear. In pursuing this more flexible approach, the Department should take account not only of varying resource capabilities but also of the desirability of providing a diversity of fishing opportunities. Maintaining a rich variety of sportfishing opportunities in the territory is particularly important, and the Department should explore, in consultation with sportfishing interests, alternative arrangements for regulating access and controlling fishing effort in order to meet this need. Clearly, the Department's ability to adapt management arrangements to particular circumstances depends heavily on resource information of the kind to be compiled under my first recommendation.

The fees for sportfishing licences were raised significantly this year and so I do not propose a further change now. Clearly though, the fee schedule should be reviewed periodically. For commercial fishing, quota licensir.g of the kind I have proposed for the smaller ocean fisheries would almost certainly provide a more effective management regime than the present arrangements, though such a change does not appear to be urgent.

HABITAT MANAGEMENT

Protecting the habitat of fish in Yukon is an even greater challenge for the Department than managing the fisheries. With substantial and growing pressures of industrial development in the territory, and with many governmental agencies as well as private interests involved, habitat management has become a major preoccupation.

Pressures on the Habitat

The fish habitat within the territory is threatened by a wide range of activities, but the most conspicuous are mining, hydroelectric projects and access development. A variety of other threats, including domestic sewage, are significant in some places.

Placer gold mining has grown rapidly in recent years and has expanded well beyond the traditional gold-producing areas. This industry often causes major disturbances to streambeds and, by increasing sedimentation, destroys the streams' capacity to support fish.

Hardrock mining in Yukon is presently limited to a few operating mines, but several major new projects are being considered. This industry's main threat to fish habitat is water pollution from mine effluents.

New hydroelectric projects are being planned or investigated in several areas of Yukon. Their expected impacts on fish vary considerably, and it is generally agreed that mitigation efforts can be only partially successful. Thus hydroelectric power development inevitably implies some sacrifice in potential fish production.

Almost all industrial developments in the territory involve building new year-round access roads into areas that could previously be reached overland only in winter. Quite apart from physical damage to fish habitat that may be caused by road construction, improved summer roads invite increased fishing pressure, which can result in newly accessible stocks being overexploited and depleted.

All these activities have an adverse impact on fish in certain areas, and altogether they comprise an assault on fish habitat that puts heavy demands on the agencies charged with protecting it.

The Regulatory Framework

The federal agencies that are formally involved in Yukon fish habitat management are the Department of Fisheries and Oceans, the Department of Indian and Northern Affairs, the Department of the Environment and the Yukon Territory Water Board. Their division of responsibilities and the regulatory framework within which they operate and interact is complicated, so I sketch these briefly below. The Yukon Territorial Government has no formal responsibility for habitat, but it exercises some influence in policy development by the federal agencies.

Department of Indian and Northern Affairs Most natural resources in Yukon are owned by the federal Crown. The Department of Indian and Northern Affairs allocates access to land, timber and minerals through a variety of federal statutes.[11] Water rights and pollution control are administered by the Yukon Territory Water Board (described below). The policies of the Department of Indian and Northern Affairs in allocating and managing the Yukon resources and approving road access on public land can have important implications for fish habitat in the territory in the same way that British Columbia's resource policies affect habitat to the south (described in Chapter 3).

Yukon Territory Water Board Under the Northern Inland Water Act,[12] the Yukon Territory Water Board issues licences and permits to use water in Yukon for a variety of purposes and to discharge waste into water. Of these, hydroelectric power generation, placer mining and mine milling are the most serious threats to fish habitat.

The board has nine members, three from federal government agencies (including the Environmental Protection Service of the Department of the Environment), three appointed by the Yukon Territorial Government and three appointed by the Minister of Indian and Northern Affairs. Significantly, the Department of Fisheries and Oceans is not represented on the board, so it must rely on referral arrangements as its avenue to protect fish habitat from licensed activities. Through these referrals, the Department assesses proposed developments and suggests measures to mitigate habitat damage but does not participate directly in decisions regarding water use.

Department of Fisheries and Oceans The Department of Fisheries and Oceans administers the Fisheries Act in Yukon, and therefore has authority for protecting fish habitat. In Chapter 3 I described the habitat protection features of the Act and general problems relating to its application; these apply to Yukon as well as British Columbia. In Yukon, additional complications arise from the relations between the Fisheries Act and the Northern Inland Waters Act.

The holder of a water licence issued by the Yukon Territorial Water Board under the Northern Inland Waters Act may be liable for prosecution under the Fisheries Act for harming fish habitat even though he complies with the licence. This is parallel to problems in British Columbia associated with provincial resource rights, described in Chapter 3, but here the potential conflict is not between conflicting resource use authorizations issued by separate governments, but between two federal statutes administered by separate agencies of the same government. So far, impasses have been avoided and the Department of Fisheries and Oceans has concentrated, with mixed success, on having conditions attached to water licences to mitigate damage to fish habitat. But the potential for conflict remains, and is heightened by the prospect of hydroelectric developments and other major projects such as the proposed Alaska Highway natural gas pipeline.

Department of the Environment The Environmental Protection Service of the Department of the Environment conducts water quality studies and participates in designing guidelines for water use by placer mining operations and municipalities. It also has responsibility, jointly with the Department of Fisheries and Oceans, for administering the deleterious substance section (section 33) of the Fisheries Act. The service is represented on the Yukon Territory Water Board, but it has been criticized for failing to aggressively advance fisheries values in the board's deliberations.

Project Approval Arrangements

To coordinate their separate interests in new industrial developments and other projects in the territory, the federal agencies have established an initial environmental evaluation procedure to provide interagency review of a wide range of projects. This is an entirely administrative process without statutory authority, but it provides an avenue for the Department to bring considerations of fish habitat to bear on development plans.

This process is initiated by the other resource agencies, described above, when they receive a development proposal. It tends to be dominated by the large staff and resources of the Department of Indian and Northern Affairs. The Department of Fisheries and Oceans, with its meagre resources, is typically in a position of reacting defensively rather than participating fully in project planning. In addition, the Department has been reluctant to acknowledge the legitimacy of the kind of trade-offs implied by integrated resource management and planning (described in Chapter 3). This is due in part to the uncompromising wording of the Fisheries Act, which the Department is required to administer (see Chapter 3). In addition, it has not had the information about fish resources, their habitats and capabilities required to engage in effective planning, or the manpower and facilities needed to monitor and enforce habitat protection measures.

Toward Improved Habitat Management

The present provisions for protecting and managing fish habitat in Yukon are inadequate for the task. The division of responsibilities among governmental agencies needs to be rationalized, their respective authorities must be clarified and arrangements for planning and project approvals need to be more systematic and effective.

A basic requirement is to clarify the authority of federal agencies involved in habitat protection. In Chapter 3 I proposed that the overlapping responsibilities of the Departments of the Environment and Fisheries and Oceans be resolved by assigning to the latter full responsibility for administering the habitat protection provisions of the Fisheries Act in the Pacific region, including Yukon. This will alleviate one source of uncertainty and duplication.

In Chapter 3 I made specific recommendations concerning the Department's commitment to integrated resource use planning and management, and techniques for its more effective involvement in this program. My proposals there for the Department's participation in referral arrangements and its authority to approve developments apply equally to Yukon. If Departmental approvals of hydroelectric power facilities, placer mining operations and similar activities were incorporated into water licences, the potential conflict between the Fisheries Act and the Northern Inland Waters Act would be resolved.

Compensation arrangements for damaged habitat were also recommended in Chapter 3, but the need for these in Yukon is far less acute because the federal government alone owns the natural resources there and administers fisheries. With only one government directly involved, the line of political accountability is much clearer than for British Columbia and resource use conflicts can be reconciled among federal agencies. Habitat protection in Yukon should focus on mitigating damage; any arrangements for compensation can be settled individually for each project where the federal government considers them warranted. Thus, in Yukon emphasis should be placed on the administrative procedures adopted by federal agencies in assessing proposed developments.

Second, the Department of Fisheries and Oceans' lack of representation on the Yukon Territory Water Board is anomalous in view of the importance for fisheries management of the board's decisions. This is apparently a legacy of the time when fisheries administration was par of the federal Department of the Environment and hence was represented by the member appointed from tha agency. In view of the legislative requirement that membership of the board must include representatives of federal departments that are most directly concerned with managing water resources in the territory, and my proposals that the Department of Fisheries and Ocean assume more responsibility for water quality, I recommend —

3. A representative of the Department of Fisheries and Oceans should be appointed to the Yukon Territory Water Board.

Through direct participation in the board's deliberations, the Department of Fisheries and Oceans should be able to more effectively influence habitat mitigation requirements in water licences.

To engage effectively in these processes, the Department must cope with the urgent need for information about fish resources and the impact of disturbances to their habitats. I have already recommended a survey of fish resources, which will throw light on the productivity of lakes and streams. In Chapter 3 I proposed that the Department carry out a comprehensive inventory of aquatic habitats in cooperation with British Columbia. In Yukon, where salmon are less prevalent and the pressures more isolated, the effort should be more selective. I therefore recommend —

4. The Department should initiate a systematic program of data collection on fish habitat in Yukon, giving priority to salmon streams and areas subject to existing and expected pressures on habitats.

Some biophysical work of this kind has been undertaken, but it has been very limited. Regardless of the scale of this program, it is important to establish an orderly system of compiling, processing and storing data to enable progressive accumulation of information available for resource planning purposes.

ADMINISTRATION

Yukon fisheries are administered as part of the Department of Fisheries and Oceans' Fraser River, Northern British Columbia and Yukon Division of the Pacific region. The Whitehorse office thus reports through the division office in New Westminster, though the biological staff report directly to the regional headquarters in Vancouver. No professional habitat management or engineering staff are currently based in Yukon.

The Yukon district's allotted staff consists of six full-time and six seasonal employees. They are expected to administer the Department's programs, including enforcement, from the Stikine River to the Arctic coast. The district's budget has been constrained during the last two years and recently the office has been instructed to terminate three of its seasonal employees. Coupled with staff turnover, which has resulted in lost experience in dealing with Yukon problems, the district has been unable to keep pace with its responsibilities. Meanwhile, the pressures on fish stocks and fish habitats, and the demands for fisheries information and enforcement, are increasing rapidly.

The Department's provisions for administering its responsibilites in Yukon are seriously inadequate. To properly manage the sensitive resources of the territory, the available manpower and support must be increased. I therefore recommend —

5. The Department should substantially increase the staff and related budgetary support for managing Yukon fisheries.

In addition to its strained resources, the Yukon district is burdened by its responsibilities to both the regional headquarters in Vancouver and the divisional headquarters in New Westminster. Most of the other agencies with which the Department must deal have more senior officials in Whitehorse and so they have more local authority. This asymmetry impedes cooperative management arrangements.

Moreover, Yukon is a minor appendage of the division responsible for the crucial Fraser River system. Yet its problems are quite different from those in the rest of the region, and so it warrants a more distinct position in the organizational framework. In view of these considerations I propose —

6. The Yukon District of the Department should be elevated to the status of a Division.

The effect of this change will be to eliminate the divided line of reporting to division and regional headquarters, to increase the authority of the Department's officials in the territory and to give a higher profile to Yukon fisheries in the Department's administrative structure.

I am concerned also about the larger organizational question of the appropriate administrative region for the Yukon territory. The Pacific region's concerns are dominated by marine resources, ocean fisheries, the complicated problems of regulating commercial fleets and other matters described in this report that have limited relevance to Yukon. The substantive common interest is in the management of salmon that migrate to some Yukon rivers, but even in this respect Yukon concerns differ insofar as they centre on international questions and are quite separate from the fisheries involved in the rest of the region.

It strikes me that the major Yukon concerns are more similar to those of the Department's Western region, which includes the prairie provinces and Northwest Territories and is concerned mainly with freshwater fish and fisheries. Yukon fisheries might better be served as part of that regional organization. I offer no specific recommendation on this matter, but in the preceding chapter I proposed a general budget and administrative review of the Department and in that context the Yukon's position within the Department's regional organization should be reviewed. Thus —

7. In the context of the budget and administrative review of the Department (proposed in Chapter 19), the position of the Yukon territory in the Department's regional organization should be assessed.

CONSULTATION

All communications between the Department and other governmental agencies, private fishing and environmental interest groups, and the public are informal. The most developed is the interagency referral process for proposed projects, but this is only between governmental agencies. The Yukon River Advisory Committee represents the commercial salmon fishermen and processors on the Yukon River and provides a forum for advising the Department on development of the fishery and management of the runs, particularly in the Dawson area. Apart from these, and occasional workshops or meetings on particular subjects or problems, consultation depends on direct contacts between fisheries officials and the public.

Consultation thus has two dimensions: among governmental agencies with common interests; and between the government and private interests. I have already described the relationships among government departments and the scope for conflict among them. Clearly, close liaison is needed between the Department and other federal and territorial agencies concerned with fisheries management. To meet this need, I propose —

8. A Yukon Fisheries Committee, chaired by a representative of the Department of Fisheries and Oceans, should be established with representatives of the federal Departments of the Environment and Indian and Northern Affairs, the Yukon Department of Renewable Resources and other concerned governmental agencies to provide a regular forum for sharing information and resolving mutual problems relating to fisheries and habitat management.

The arrangements for this consultative body should be similar to those I propose in Chapter 18 for the Canada-British Columbia Fisheries Committee.

To provide for consultation between the Department and private groups with fisheries interests, the arrangements must be more flexible. In the special circumstances of Yukon, the most pressing need is for organized consultations with recreational and commercial sportfishing interests to communicate and examine problems of fisheries management, to seek their advice and to promote their cooperation in regulating fishing activity. Therefore —

9. The Department should strike a Yukon sportfishing advisory committee to serve as a forum for discussing problems relating to management of the sport fishery.

I have described the appropriate structure and procedures for such advisory committees in Chapter 17.

Consultation with representatives of the smaller commercial, native and subsistence fisheries is more difficult because of the barriers to communication and travel. The Department's present, more modest arrangements, involving occasional meetings and the Yukon River Advisory Committee should be continued and expanded as circumstances require.

CONCLUSION

The fish resources of Yukon have not hitherto received the attention required to assure their proper conservation and management. Present knowledge about them is meagre, but there is evidence of excessive exploitation in some water systems. This must be reversed if the territory's rich recreational opportunities are to be preserved. And the growing number and size of assaults on fish habitat call for a much more aggressive approach to environmental management. Many of the present deficiencies are the result of an awkward administrative organization and insufficient support, which are therefore subjects of many of my recommendations.

Yukon fisheries are overshadowed by the ocean fisheries administered by the Department's Pacific regional organization. But they are nevertheless very valuable resources; they enrich lifestyles, the economy and the social fabric of the territory substantially. Certainly they deserve to be properly conserved, managed and reconciled with the pressures of industrial development. My proposals are intended to begin closing the gap between the present provisions for Yukon fisheries and the needs of the last decades of the 20th century.

FOOTNOTES

1. Yukon Conservation Society, Exhibit #155, p. 1.
2. Howard Paish and Associates Ltd., "The Yukon Sport Fishery: A Policy Oriented Assessment of Sport Fishing in Yukon." Prepared for the Department of Fisheries and Oceans, Government of Yukon, Department of Indian and Northern Affairs, February, 1981.
3. Howard Paish and Associates Ltd., "The Yukon Sport Fishery." p. 58.
4. Thomas L. Burton, Outdoor Recreation in the Yukon. Department of Recreational Administration and Population Research Laboratory, University of Alberta, 1977.
5. "1980 Survey of Sportfishing in Canada, Preliminary Results." Prepared for the Department of Fisheries and Oceans, 1981.
6. Howard Paish and Associates Ltd., "The Yukon Sport Fishery": and "1980 Survey of Sportfishing in Canada, Preliminary Results."
7. Howard Paish and Associates Ltd., "The Yukon Sport Fishery."
8. Council of Yukon Indians, Exhibit #153, p. 1.
9. Mr. J. Jack, Council of Yukon Indians, transcripts of the public hearings, Volume 49, p. 10,019.
10. Exhibit #155, p. 8.
11. Territorial Land Act, Revised Statutes of Canada 1970, Chapter T-6; Yukon Placer Mining Act, Revised Statutes of Canada 1970, Chapter Y-3; Yukon Quartz Mining Act, Revised Statutes of Canada 1970, Chapter Y-4.
12. Revised Statutes of Canada 1970, First Supplement, Chapter 28.

Part VII

Toward Policy Reform

CHAPTER 21

POLICY IMPLEMENTATION AND REVIEW

> *. . .the present situation cannot be quickly resolved by one or two system changes. Instead, it will require hard work and responsible decisions by high quality managers for a period of years . . . . We would hope that this Commission will start this process happening, as the potential of the B.C. fishing industry is too great to be lost, both to our economy and to Canada as a nation.*
>
> THE PACIFIC COAST FISHING VESSEL OWNERS GUILD[1]

The recommendations in this report call for a host of changes to federal fisheries policy as it applies to the Pacific region. Some of these imply minor changes; others call for fundamental reforms. In this chapter I suggest steps for implementing these changes and keeping pace with new challenges in the future.

POLICY IMPLEMENTATION

Fisheries policy is embodied in federal legislation, ancillary regulations, fishing licences, and administrative policies and procedures. Implementation of my proposals will require changes to all of these policy instruments in varying degrees, and special administrative arrangements will be needed to mould them into a modern and cohesive system.

Developing the Policy Instruments

To begin with, all of the policy instruments require thorough review and overhaul both to rectify present deficiencies and to implement needed reform.

Legislation Although the Department is directly involved in the administration of nine federal statutes in the Pacific region, the core of fisheries legislation is the Fisheries Act. The legislative changes required to implement my proposals centre on this statute.

Originally passed in 1867, and riddled with amendments over the decades, the Act is as old as Canada and its age shows.

Many provisions of the archaic Act are anachronistic and ambiguous. For example, it requires that a dory be equipped with a compass, two quarts of drinking water and two pounds of food for each crew-member, and a fog-horn or trumpet. And as I pointed out in Chapter 16 it contains the out-dated sentence of hard labour, a serious ambiguity resulting from what appears to be a drafting error, and inconsistencies among levels of penalties.

Furthermore, matters are divided between the Act and its supplementing regulations unsatisfactorily. Crucially important features of policy, such as commercial licensing and fleet development arrangements, receive scant attention in the Act; these and other areas of important and sensitive policy are found in the regulations, passed without formal debate in Parliament. In contrast, details that should be in regulations, such as the minimum distance between stationary salmon nets, are set out in the Act in painstaking detail.

Third, the scope of the Fisheries Act is too narrow and its tone is entirely punitive. It is silent about the management and planning responsibilities of the Department and the social and economic objectives it is to meet. In addition, it leaves the Department open to legal challenge in carrying out some of its most important programs, such as allocating catches among sectors of fishing fleets. Almost all of the Act is devoted to creating offences and prescribing penalties.

Finally, the Act fails to reflect the differences in character between the fisheries on the Pacific coast and those on the Atlantic, with their different resources, fishing methods, licensing systems, traditions and problems. Many provisions that are intended to apply nationwide are extremely general in scope. This leaves important features of policy to regulations, leading to the imbalance between the Act and regulations described above. As well, it places too much decision-making power on the Minister, and delegates no authority to the regional officials, who must actually make most management decisions.

Thus, a major overhaul of the Fisheries Act is long overdue; new policies should not be implemented through yet another patchwork of amendments. Accordingly, I recommend that—

1. **The Fisheries Act should be repealed and replaced by a modern, lucid statute containing the main principles of fisheries policy for Canada. The new Act should—**
    i) **Include a clear statement of national fisheries policy objectives.**

ii) Set out the Department's management responsibilities and planning procedures. The scope of these should be broad, leaving no doubt about the Department's mandate to effectively manage fisheries and fleet development.

iii) Commit the Department to integrated resource management and planning, and set out arrangements for dealing with projects and developments that affect fish habitat.

iv) Devote a separate part to Pacific fisheries, consistent with the national policy framework.

v) Set out the legal authority and procedures to be followed in allocating the sport, commercial and Indian fishing rights recommended in Parts III and IV of this report.

vi) Provide for the appointment of the Pacific Fisheries Council recommended in Chapter 17, and create the Pacific Fisheries Licensing Board proposed in Chapter 8.

vii) Formally delegate decision-making authority to the licensing board and, where appropriate, to regional officials of the Department.

viii) Include a clear and consistent structure of penalties, recommended in Chapter 16.

The anachronisms in the current Act should be eliminated; some provisions now in regulations should be elevated to the new statute, and *vice versa.* With a separate part devoted to Pacific fisheries policy, it should be much easier to strike an appropriate balance between the need for a national policy and the need to recognize regional diversity, and between the amount of policy detail to be incorporated into the new Act and the amount to go into regulations. Many other considerations will go into drafting the new legislation concerning its structure, organization, and detailed provisions, which cannot be dealt with in this report.

Although I recommend that the Fisheries Act be replaced, this process undoubtedly will be time consuming. Some recommendations in this report (particularly those concerning licensing in Part III) should be implemented before the end of this year and thus should not wait for a new Fisheries Act. Accordingly, I recommend that—

2. Pending passage of a new Fisheries Act, new commercial fisheries licensing regulations should be passed immediately to implement the proposals in Part III of this report.

Regulations Regulations are passed by the federal Governor General in Council (effectively, the cabinet) and have the force of law. In all, the Department administers 21 sets of regulations in the Pacific region, passed under several statutes and covering a diverse range of subjects including fisheries management for the various species, commercial and sportfishing licensing, fish inspection and Yukon fisheries. Most deal with detailed aspects of policy, such as specifying mesh sizes for nets and other gear restrictions, and describing management areas. But they now also include laws that have major implications for fisheries management and private interests, such as the Department's licensing program.

Inconsistencies and duplication among some of the regulations have arisen as a result of their having been enacted and amended piecemeal over the years. In conjunction with preparing the new Act, the government should streamline and consolidate the Pacific fisheries regulations. Therefore, I recommend that—

3. New Pacific fisheries regulations should be passed under the new Fisheries Act. They should contain administrative detail ancillary to the Act and policies that must be adjusted quickly in response to changing conservation and management needs.

I will not comment on the many detailed aspects of the current regulations, but two disturbing problems deserve mention.

One concerns the time it takes for regulations to be passed. At the Commission's hearings, the Department described the tortuous and complicated government procedures that are followed in obtaining needed amendments to fisheries regulations. Before becoming law, they pass through 17 hands within the Department and the Privy Council organization and this can take up to 6 months. Delays of this nature are understandable for amendments to statutes that must be passed by Parliament, but they are inexcuseable for changes to regulations that should be far more expeditious. They have created serious management and enforcement difficulties and have been an acute embarassment for the Department in dealing with the public and provincial government. For example, this year's freshwater sportfishing regulations were not passed until the fishing season was half over. While they are in limbo, their enforcement must depend on voluntary public compliance or, in some cases, bluff.

By their nature, most Pacific fisheries must be conserved and managed seasonally, and the Department must be able to adjust its policies quickly in response to changing needs. Current procedures are a serious hindrance to the Department in effectively discharging its responsibilities. So I recommend that—

4. The federal government's procedures for passing fishing regulations should be streamlined so that they can be changed quickly in response to changing needs.

The second problem concerns regulations relating to commercial fisheries management. Under their current structure, the regulations define a number of fisheries management areas on the Pacific coast and stipulate the closed fishing times for them. The Director General has the authority to vary closed times for any area; this is how, for example, salmon fisheries are opened and closed during the season.

However, this technique is cumbersome for effective management, which often requires regulating fishing in small areas to protect specific stocks. An infinite number of areas on the coast could be selected for openings and closures, and the requirement that areas be formally described in regulations is too rigid. This is, incidentally, an especially urgent matter in the fisheries of the Pacific: in the intensive roe-herring fishery, for example, adjusting the boundary of an opening by a short distance can have crucial management implications. So the areas should not be defined in the regulations; regional officials need the authority to adjust them flexibly.

This problem was identified in a 1980 report of a standing joint committee of the Senate and House of Commons,[2] which recommended amendments to federal legislation that would allow for more flexibility. This deficiency should be rectified without further delay. So I recommend that—

5. **Department officials in the Pacific region should be authorized to designate areas to be subject to fisheries openings and closures.**

Licences In this report I have recommended that current commercial licences be replaced by limited-entry and quota licences and mariculture leases. And in Chapter 14, I recommended a new system of permits and agreements for Indian fisheries. These will be the point of contact between the government, that must authorize access to the resources, and the fishermen who utilize them.

I recommended in Part III that the new licensing arrangements be in place for the 1983 fishing season. Therefore—

6. **The Department should immediately prepare Indian fishery agreements and permits (recommended in Chapter 14) and new commercial fishing licence documents, and establish administrative arrangements for issuing new long-term limited-entry and quota licences and mariculture leases (proposed in Part III).**

The commercial licences should be relatively simple and short documents, identifying licensees and species to be fished and, where appropriate, designating vessels and fishing zones. Mariculture leases will be more involved, requiring detailed fisheries management planning. Indian fishery agreements will be complicated also, and should be prepared in close consultation with the bands and the Indian fishery advisory committee, recommended in Chapter 17. The Indian permits should be simple to prepare.

Expediting Reform

Implementing the wide-ranging recommendations in this report will be a major undertaking for the government, affecting virtually all of the Department's administrative units in the Pacific region and Ottawa, and other government agencies. This task must begin at once and proceed systematically. Delay will be costly in terms of the substantial economic and social benefits that will flow from modern and reformed Pacific fisheries policies.

Responsibility for these initiatives, therefore, should be assigned to a team that has the stature, time and resources to see them through, and is free from the distractions of day-to-day fisheries administration. A special unit should therefore be created for this purpose. Accordingly, I recommend—

7. **A temporary Minister of State for Pacific fisheries, junior to the Minister of Fisheries, should be appointed and given responsibility for implementing reforms in Pacific fisheries policy.**

A minister with cabinet stature will be in the required position to shepherd new legislation through Parliament in conjunction with the senior minister; to oversee passage of new regulations; and to liaise effectively with other ministers such as those responsible for Indians, the environment, finance and industrial development. As well, he could speak with authority on behalf of the government in explaining progress to the public.

The special minister will require full-time assistance from the Department. Thus:

8. **A full-time policy and planning group within the Department's Pacific region should assist the temporary Minister of State in implementing policy reforms.**

In Chapter 19 I recommended that the Department establish a permanent policy and planning committee. For the temporary purpose of making these reforms, this group should function fulltime. Under the direction of the Minister, it should immediately begin to make the necessary arrangements for appointing the Pacific Fisheries Council (recommended in Chapter 17); to organize the Pacific Fisheries Licensing Board (proposed in Chapter 8); to initiate discussions with the province toward reaching a federal-provincial agreement (recommended in Chapter 18); and to assist in launching the budget and organizational review of the Department (recommended in Chapter 19). It should determine priorities for the other reforms and set a timetable for dealing with them in consultation with the Pacific Fisheries Council.

POLICY REVIEW

The most striking feature of Pacific fisheries policy is its complexity. The task of isolating and analyzing the host of interrelated issues has been a major challenge for me and this Commission's staff. While I outline new policy directions in this report, it must be recognized that no policy framework will be suitable forever, and the government must face the need to adapt its policies as circumstances change. The recommendations in this report are designed to provide the government with flexibility to do this.

Most policy is developed within the Department itself, and my proposal for a planning committee will focus this process and make it more systematic. The new consultative structure I proposed in Chapter 17 will provide valuable help in exploring the implications of proposed changes in policy and in alerting the Department to difficulties with policy and needed changes.

However, sometimes neither the Department's internal capabilities nor consultative arrangements will be adequate. Consultants, task forces and formal commissions of inquiry can often be helpful in advancing fisheries policy.

In British Columbia the consulting industry is not nearly as fully developed for fisheries as it is for other resource industries, such as forestry and mining. Those in the field provide mainly biological services and their involvement in policy formulation and review has been limited. In general, consultants are best equipped to provide advice about technical questions and problems that are relatively narrowly specified.

A task force typically includes a small number of experts in a field who are appointed to advise the government on specific features of public policy. Sometimes they include government officials. By pooling the experience and perspectives of experts on a subject, such groups can tackle more complicated and esoteric problems that do not involve widely divergent interests and do not call for an extensive public inquiry process.

Where reforms will affect diverse groups of people or involve fundamental questions of public policy, the government should seek the advice of formal commissions of inquiry. With high public visibility and public proceedings, they are able to gather facts and canvass advice from a wide spectrum of the public. Public hearings help various interests to understand the problems and positions of others and improve communications between groups and individuals with competing interests. They should be used more frequently than they have in the past. Had an inquiry of this nature been conducted earlier, much of the backlog of controversy and frustration over policy could have been avoided. And had an inquiry been struck in the late 1960s before the Davis Plan introduced limited entry to the salmon fishery, many of the difficulties experienced with this program might have been foreseen and forestalled. The same can be said about the almost continual controversy that has surrounded the Department's habitat protection initiatives over the last decade.

Furthermore, the terms of reference should be focused sharply on individual policy problems as they emerge. The scope of this Commission's inquiry was very broad, and some of the issues I have had to deal with (such as commercial fishing licensing, Indian fishing arrangements and Yukon fisheries policy) could have justified separate inquiries, especially in light of the need for reform in all of them to cope with modern pressures. More frequent commissions thus would serve two purposes: more attention would be paid to individual questions of policy; and solutions to problems would be more timely.

CONCLUSION

This Commission's work is now completed and reforms can begin. Whether or not the specific recommendations in this report are adopted, it is important for the government to proceed now to reform fisheries policy systematically. This will call for a concentrated effort from the Department and careful planning. The new formal policy framework and interim organizational arrangements proposed in this chapter should sustain the momentum towards improved Pacific fisheries policy.

FOOTNOTES

1. The Pacific Coast Fishing Vessel Owners Guild, Exhibit #120, p. 18.

2. Fourth Report for the First Session of the Thirty-second Parliament from the Standing Joint Committee of the Senate and the House of Commons on Regulations and Other Statutory Instruments. July 17, 1980.

CHAPTER 22

OVERVIEW

> *There is no quick and easy solution to Pacific Coast fisheries management problems which have been decades in the making .... Any long-term plan to address those challenges will be resisted by the inertia of tradition and by the combative attitudes forged in years of conflict among competing users of the fishery resource. But, there is enormous incentive for extraordinary effort to transcend the problems of the past.*
>
> ASSOCIATION OF PROFESSIONAL BIOLOGISTS OF BRITISH COLUMBIA[1]

In the first chapter of this report I emphasized the overriding need for a coherent policy for the Pacific fisheries, a framework based on clear objectives that would eliminate the ambiguities, contradictions and confusion of the past. I also outlined some general objectives for fisheries policy, consistent with this Commission's terms of reference, to provide a broad framework for designing policy reform. The subsequent chapters of this lengthy report have attempted to unravel the present management arrangements, analyze the problems that must be resolved and suggest improvements.

My recommendations are numerous, and they range from minor suggestions to proposals for fundamental changes in public policy. The complexity of the issues and the difficulty of dealing with them in an orderly sequence tend to cloud their relationship to an overall policy framework. So in this concluding chapter I refer back to the general policy objectives I articulated at the outset to put the major thrust of my recommendations into that perspective.

Resource Conservation

The constitutional responsibility of the federal government for fisheries is clear, and its first obligation is to ensure that the resources are properly conserved, managed and developed. These are the subjects dealt with in Part II. The first requirement for management is knowledge about the resources themselves; that is, the stocks of fish, the habitat on which they depend and the pressures they are subjected to. I have reviewed the condition of the stocks in Chapter 2, and found that herring, halibut, most groundfish and minor species are either in good condition or are recovering from past overfishing. Salmon, by far the most valuable, are more problematic. Some stocks are healthy and others are recovering; but in the aggregate, our salmon remain well below their historical levels of abundance. The immediate constraint on rehabilitating most of the depressed stocks is inadequate spawning escapements, a consequence of excessive fishing. Ultimately, however, the capacity to produce salmon is governed by the quality of the habitat.

Protecting and managing fish habitat is an especially demanding responsibility on the Pacific coast because salmon depend on estuaries, rivers and streams that are subject to innumerable disturbances and pollution from industrial activities throughout the western watersheds. But our present knowledge about critical fish habitats, their potential productive capacities and the impact of other activities on them is seriously deficient. This impedes not only fisheries management but also effective planning of other resource development. Because of the interest of both governments in this information, I have recommended in Chapter 3 a major inventory of the freshwater and estuarial fish habitats in British Columbia, sponsored jointly by the federal and provincial governments. This will enable long-term objectives to be set for the fisheries; it will provide the essential information for integrated resource management planning; and it will help to identify opportunities for enhancement. I also propose more systematic procedures for approving development projects that affect fish habitat and means of ensuring that habitat losses will be mitigated or compensated.

Fisheries management, particularly in the dominant salmon and herring fisheries, leaves much scope for improvement. In Chapter 4 I have recommended new arrangements for collecting the needed information, formulating plans, managing fishing during the season, and regularly evaluating performance in consultation with the participants in the fisheries. Effective fisheries management depends on continuing scientific research, and specific needs are identified in Chapter 6.

With the approaching end of the first phase of the Salmonid Enhancement Program, plans must be made for the future. In Chapter 5 I reviewed the experience so far, noting, on the one hand, the high expectations for meeting fish production targets and, on the other hand, the uncertainties surrounding these predictions, the impact that enhanced stocks will have on wild stocks, the outcome of lake enrichment projects, and the control of commercial fishing fleets, all of which threaten the ultimate success of the program. I recommend that the program be continued on a more modest scale under a modified intergovernmental agreement, with less emphasis on large-scale artificial enhancement works until the success of those facilities already built can be assessed.

The management of habitat, fishing and enhancement are interdependent, and I propose measures to integrate them more closely. The success of these activities depends, in turn, on improvements in regulating access to the fisheries, the subject of Parts III and IV.

Maximizing the Benefits of Resource Use

The fish of the Pacific coast are exceptionally valuable, and competition for the available catches is intense. Salmon bring high prices in the commercial fishery, they generate excellent sportfishing opportunities, and for Indians they provide traditional food and cultural support. To ensure that the resources are used in the most beneficial way, account must be taken of these differing economic and social benefits.

By far the largest catch is taken in the commercial fisheries, but the industry has been allowed to develop in such a way that the potentially high returns are being dissipated in grossly overexpanded fleets and unnecessarily high costs of redundant fishing capacity. In all of the major commercial fisheries, and especially in the salmon, herring and halibut fisheries, the major challenge today is to rationalize the fleets to the available resources.

Far too many commercial fishing privileges have been issued and, through subsidies, the government has encouraged fleets to expand so that they are now a continuing threat to proper management and conservation and the major obstacle to improved economic performance of the industry. To rectify this most serious failure of past policies, I have proposed fundamental reforms in the present obsolete and incoherent licensing systems. In Chapters 7 and 8 I recommend a policy framework for modern commercial fisheries, aimed at keeping fishing capacity in balance with the resources available, encouraging the fleet's structure to develop efficiently, providing security to fishermen and vesselowners, enabling the government to adjust fishing privileges as conditions change, recovering for the public the returns from resources in excess of reasonable returns to fishermen and vesselowners, and simplifying administration.

For the commercial fisheries other than salmon and roe-herring, I propose in Chapter 10 that those fishermen who now operate vessels with limited-entry licences be given new licences that authorize them to harvest a specific quantity of fish, related to the total allowable catch for the fishery. These licences, and all new quota licences, should carry explicit 10-year terms. In addition to facilitating fisheries management, this will encourage fleet rationalization and permit relaxation or abolition of many of the intricate regulations now imposed on vessels, gear and fishing times.

For the much more complicated salmon and roe-herring fisheries, I propose, in Chapter 9, new limited-entry licences with 10-year terms, specifying the gear authorized. I also recommend policies for dealing with the contentious problem of allocating the catch among competing sectors of the fleets. I propose that the currently excessive licensed capacity in these fleets be reduced by one-half over a 10-year transitional period, and that this process be facilitated by a voluntary licence retirement program financed jointly by the industry and the government.

My recommendations include a variety of other improvements in the regulation of access to resources. I suggest that licences that provide access to groups of species or stocks that are fished and managed separately be abolished in favour of more specific privileges, and that licences should apply to defined fishing areas. I propose more consistent licence fees and royalties related to the value of the fish, and that new licences be issued by competitive bidding. I recommend that revenues from royalties and bonus bids for new fishing privileges in the salmon and roe-herring fisheries be directed to cover costs of retiring licensed fishing capacity and to finance new enhancement. And I suggest that the several forms of direct and indirect subsidies now provided for new vessel construction be abolished.

In addition, I advise that provisions be made for accommodating development of the fledgling mariculture industry and for cautious experiments in ocean ranching for salmon. And I recommend an entirely new administrative structure for issuing licences, processing appeals and retiring excess licences, thereby separating these important responsibilities from those relating to resource management.

My proposals for licensing commercial fishing and fleet rationalization are far-reaching, but the present arrangements are grossly inadequate, and their legacy of failure to promote orderly development of the primary fishing industry necessitates fundamental reforms.

Economic Development and Growth

The commercial fisheries of the Pacific coast have hitherto failed to achieve their economic potential mainly because of excessive fleet development. In Chapter 13 I have examined other aspects of the industry's organization, relating to its ownership, control and competitiveness. The historical pattern of control of fishing fleets by processing companies has been weakening and, from the viewpoint of the public interest in industrial organization and competitive markets for fish, this is desirable. To prevent any reversal of this trend, however, and to forestall any other excessive concentration of fishing privileges, I recommend strict limits on the permitted holdings of any licensee. I propose that the Department's concern with the processing industry should focus more on regulating quality standards for products and less on regulating trade.

Although the fishing industry has been unable to use the existing natural resources efficiently, the opportunities for developing them are exceedingly bright. Salmon are highly responsive to enhancement, and coupled with improved management to rebuild wild stocks, total yields might be doubled. I explain in Chapter 11 that other fish and shellfish are amenable to mariculture, and the waters of the Pacific coast are well suited to this activity. Mariculture activities could also provide new economic opportunities for coastal communities. I have therefore recommended a system of mariculture leases to provide an orderly framework for developing opportunities in mariculture and ocean ranching.

Social and Cultural Development

In designing fisheries policy, the social and cultural consequences of any changes must be considered carefully because of the dependence of particular groups and communities on commercial, recreational and Indian fishing. This raises special problems in the face of the urgent need to reduce the size of fishing fleets. So my proposals for fleet rationalization in Part III incorporate provisions for securing the fishing privileges of those established in the fishery to a degree that they have hitherto not enjoyed, providing them with protected opportunities to continue participating in the industry and focusing fleet reduction on voluntary withdrawals for the next 10 years.

Indians occupy an important place in the commercial fisheries, and in view of their special problems of economic and social development their continued participation should be encouraged. In Chapter 12 I review these problems and recommend support for Indian fishing organizations. The successful adaptation of coastal Indians to commercial fishing suggests that this affords the most promising avenue for developing their economic and social self-reliance.

The traditional Indian food fishery, involving Indians throughout the coast and the interior, raises special problems, reflected in the prolonged abrasive relationship between some bands and the Department of Fisheries and Oceans. In Chapter 14 I propose new approaches to this question that will secure bands' rights to defined quantities of fish. Under proposed new arrangements, Indians would be able to use their fish to their best advantage through consumption or sale, and to engage constructively in fisheries management and enhancement.

Sportfishing has become an important element in the quality of life for hundreds of thousands of Canadians. Excessive pressure on the stocks on which most sportfishing depends, and progressive restrictions on fishing, are threatening to erode sportfishing values; the immediate challenge is to preserve the quality of sportfishing opportunities while constraining the rate of exploitation. The difficulty in meeting this challenge is aggravated by a dearth of reliable information about sportfishing activity, catches and stock conditions. I propose in Chapter 15 a 5-year program aimed at preserving sportfishing opportunities while holding sport catches to their present levels; improving the information base to allow for more appropriate sportfishing management planning; and, in consultation with the sportfishing community, designing sportfishing policy for the longer term. My sportfishing proposals also involve regulating access through higher licence fees and a system of punchcards and tags, and integrating the federal saltwater licence with British Columbia's freshwater sportfishing licence.

Returns to the Public

The returns to labour and capital employed in commercial fishing are now generally low, mainly because of overexpanded fleets. With the rationalization measures I propose in this report, however, the returns can be expected to improve substantially. Consistent with my terms of reference, I have proposed in Part III charges to capture for the public some of these returns from the resources used after "fair and reasonable returns to fishing enterprises."

The proposed schedule of royalties for all commercial fisheries, based on recent catches, would yield some $15 million annually, and I propose that these rates be increased if the value of fish rises. These levies will capture only part of the gains from fleet rationalization, however; the rest will accrue to existing fishermen until the proposed new licensing is in full effect.

It is not unrealistic to suppose that current catches could be taken with half the size of the current fleets at half the present cost, implying a net economic gain in the order of $100 million annually. But it may take up to a decade to achieve this degree of rationalization, and even longer before the gains are fully reflected in royalties and payments for new fishing licences. The immediate increase in sportfishing licence fees will yield about $4 million annually.

I have also proposed elimination of subsidies for constructing and improving fishing vessels, indirect subsidies under income tax arrangements, and other aid to vessel construction through loan guarantees. The effect on the federal treasury of abolishing all these programs cannot be quantified, but it implies savings of several millions annually. Less direct government expenditures can be expected to be reduced also; for example, fewer fishermen operating smaller more efficient fleets can work longer each year and thus depend less on public assistance.

Against these new revenues and savings, my proposals call for increased expenditures for certain purposes. I recommend a renewed enhancement program but on a somewhat smaller scale than the present one, and with part of the federal share to be collected from the commercial and sport fisheries. The cost of the proposed inventory of aquatic resources will be shared with the provincial government. The federal government's contributions to both of these programs should be less than its expenditures under the current enhancement program.

The fleet-reduction program calls for a federal contribution of some $8 million annually for 10 years. I have also proposed strengthening some of the Department's management and administrative capabilities, especially the monitoring of stocks and catches, commercial licensing, habitat management and enforcement.

From the government's and taxpayers' financial point of view, the balance appears favourable. Within a few years, increased revenues will more than offset these additional costs, and in the long term can reasonably be expected to exceed, for the first time, the costs of managing the Pacific fisheries.

Flexibility

Fisheries policy must recognize the Pacific fisheries' susceptibility to profound and unpredictable changes in resource abundance, technology and markets. The failure of past arrangements to accommodate change in an orderly way has been exceedingly costly. Most conspicuously, controls on fleet development have been overwhelmed by sudden increases in the demand for most fish in recent years, leaving all the major commercial fleets grossly overexpanded. Moreover, the form of fishing licences and the way they have been administered leaves the government with little flexibility, so the problem is made more intractable. Throughout this report I have been concerned to recommend licensing and other arrangements that will be resilient to disturbances, provide the government with the flexibility needed to adjust to changing conditions without disrupting explicit or implied commitments, and ensure that it has the information needed to anticipate changes.

Administrative Simplicity

A policy, no matter how well conceived, will succeed in achieving its objectives only if it is effectively administered and enforced. I examine the question of enforcement in Chapter 16. This is a special problem for the fisheries because opportunities to abuse fish and their habitats are so profuse that adherence to fishing laws and regulations depend heavily on voluntary compliance and cooperation. This essential support is undermined if violators are seen to be dealt with leniently. Although incentives to violate the fishing laws and regulations have been increasing, the enforcement effort has not kept pace and needs to be strengthened.

My proposals for strengthening the enforcement effort include recruiting a specialized staff of fisheries enforcement officers, who would be primarily responsible for laying charges, collecting evidence and pursuing cases through the courts. These responsibilities would be largely separate from those of fishery officers, who are concerned mainly with resource management. I also recommend strengthening prosecuting expertise, and a variety of other changes to modernize the legislation, to stiffen fines and to more frequently suspend the fishing privileges of offenders.

Fisheries administration is heavily criticized by commercial, sport and Indian fishermen and other groups who deal with the Department. My investigation of the Department's administrative system, summarized in Chapter 19, reveals serious weaknesses, but not all can be attributed to arrangements in the Pacific region. At the root of many problems is the absence of a clear policy framework and explicit objectives to guide administrators. This results from obsolete legislation, regulations that are more appropriate for other regions of Canada, vague guidelines for dealing with important problems such as the allocation of the catch among competing groups, and divided responsibilities among federal, provincial and territorial departments and ministries. Other difficulties arise from constraints on budgets and manpower and a turmoil of reorganization in recent years.

To rectify these deficiencies I propose separating from the Department's resource management structure, the important responsibilities for administering the commercial licensing system and appeals; consolidating responsibilities for habitat management and enforcement; coordinating research; and changing certain lines of reporting. My proposals include improved staff training and the formation of a much needed policy-development group within the Department. I also identify other problems of Departmental administration and financing, and recommend a thorough budget and administrative review. In general, the future policy for the Pacific fisheries needs to make a clearer distinction between day-to-day administration and high-level policy and planning.

Over the decades, fisheries policy has become heavily encrusted with restrictions and regulations governing fishing privileges and the details of fishing. I recommend that many of these be relaxed or abolished altogether.

Some have never served a legitimate purpose, and others will become unnecessary under the proposed fleet rationalization and licensing policies. I also propose elimination of personal licensing of fishermen, certain licences required for fishing vessels, and some of the Department's present activities in regulating exports of fish products.

This inquiry has left me concerned that the government's general approach to its responsibilities in the fisheries has hitherto been directed too much at details, at placating vociferous groups and at "attempts to do too many things for too many people at the cost of neglecting its most serious responsibilities."[2] In one area of administrative responsibility after another I have observed an absence of policy direction, priorities and planning and, with some exceptions, a diffuse distribution of responsibilities.

It is time to take a more scientific and businesslike approach to managing the Pacific fisheries. The fishing industry does not need or want paternalistic regulation; it is a technically sophisticated and potentially robust industry; and it needs only a clear policy framework to enable it to flourish. Sportfishing organizations also understand the need for scientific management and objective planning. And many Indians, who have struggled to defend their special position in the fisheries, are now prepared to use modern contractual and business arrangements to pursue their goals.

Many facets of federal fisheries management interface with administrative responsibilities of the Province of British Columbia, especially in the fields of habitat management, pollution control, sportfishing regulation, mariculture and enhancement. I explained in Chapter 18 that the present meagre arrangements for reconciling the two governments' interests and activities often result in duplication of effort, lost opportunities for constructive cooperation and sometimes friction. So I suggest that the two governments enter into an agreement on fisheries matters, incorporating some of the provisions contained in agreements between the federal government and other provinces, but also including new arrangements for reconciling their interests in habitat management, resource inventories, enhancement, freshwater fisheries, sportfishing licences and the administration of shellfish and mariculture. I recommend also a high-level intergovernmental consultative group to plan and supervise cooperative programs and to resolve mutual problems.

The problems of the Yukon Territory are quite different, being dominated by freshwater sportfishing and habitat damage associated with mining. In Chapter 20 I explain the pressing need to overcome the prevailing lack of knowledge about the territory's sensitive fish resources, to clarify the responsibilities of federal and Yukon regulatory agencies, and to strengthen provisions for fisheries and habitat management.

In order to cope with problems in the complicated Pacific fisheries, and especially to effect policy changes, the government needs systematic consultative arrangements to communicate problems and channel advice from those with interests in fisheries and fish habitat management. While the Department has created advisory groups in considerable number and variety, many do not enjoy the confidence of the participants that is essential for their success. The present arrangements have developed piecemeal; they lack coherence and take excessive amounts of time and effort on the part of administrators and private participants. I propose in Chapter 17 that they be replaced with a more systematic consultative structure that would have at its centre a Pacific Fisheries Council to provide general policy advice to the Minister and that would channel the advice of more specialized advisory committees. These consultative arrangements will be particularly important in implementing reforms in the wake of this inquiry.

Finally, I propose in Chapter 21 specific means for effecting the needed policy changes and for reviewing policy in the future. The current Fisheries Act is archaic and inadequate, and I recommend that it be replaced by a modern comprehensive statute structured to permit a sharper focus on Pacific fisheries within a national policy framework. I propose that regulations and ancillary licence documents be reviewed and redesigned as well.

To ensure that the new policy framework is implemented quickly and systematically, I suggest that a special temporary Minister of State for Pacific fisheries be appointed. As well, I recommend means of dealing with new policy questions, to help the Department meet new challenges as they arise.

Readiness for Change

At the outset of this report I noted a widespread perception of the need for fundamental changes in fisheries policy. This attitude goes well beyond the fishing community because fish, and the quality of the environment they depend upon, are part of the heritage of Canadians on the Pacific coast.

> When we discuss and manage the fishery — particularly salmon — we are dealing with a certain mystique, an aura surrounding the salmon, that is based on a long and exciting history that all British Columbians and many Canadians feel they understand.
>
> Fishing is a way of life for many British Columbians and has been part of the coastal community for centuries. It formed the back-

> bone of the native Indian food supply and was an early and lasting mainstay of the colonial and provincial economy. Salmon was then and is now an important and fascinating marine resource.
>
> Today many British Columbians continue to earn their living fishing or in fishing-related work. Others are joining a growing number of people who are dependent on the recreational fishery which attracts hundreds of thousands of resident fishermen and tourists seeking their sporting pleasure in the salmon sports fishery.
>
> Yet today we are discussing the fishery as though this valuable and renewable resource, this part of our culture, could disappear. We regard it as being in serious peril and we routinely speak of the "crisis" of the fishing industry.[3]

My investigations suggest that this anxiety is justified and, as this report indicates, substantial policy changes are needed.

This inquiry has been held at a difficult time for the fisheries. The generally depressed economic conditions, high interest rates and rising costs, which have affected all industries, have aggravated the underlying structural problems of the fishing industry. Sport fishermen's and Indians' anxieties about their access to fish are unprecedented. These conditions not only exacerbate apprehensions about policy changes, but also force recognition of the need.

> This inquiry is being held at an appropriate time. We now have a declining resource base, overcapitalization in the catching and processing segments of the industry, reduced world market prices for seafood products, and increasing pressure on the resource from the numerous user groups.[4]

This is, therefore, not a time for complacency; the fishing community is ready to consider new directions.

> Above all else that comes out of this process, Mr. Commissioner, we hope that there at least comes an understanding by all participants that the resource is in trouble. We are all part of the problem and we must all be part of the solution.[5]

As the western Canadian poet Sarah Binks urged on "the sailor who puts to sea when the wind is right,"[6] so the government should be encouraged to initiate fisheries reform.

If the government seizes the present opportunity to start the process of reform, building on the consultative process that this Commission has initiated, I believe it will be possible to reverse the current adverse trends and begin to realize the rich potential of our Pacific fisheries resources.

FOOTNOTES

1. Association of Professional Biologists of British Columbia, Exhibit #96, p. 5.
2. Fisheries Association of British Columbia, Exhibit #63, p. 34.
3. New Democratic Party Caucus, Exhibit #136, p. 1.
4. The Pacific Gillnetters Association, Exhibit #70, p. 3.
5. B.C. Wildlife Federation, Exhibit #144, p. 49.
6. Paul Hiebert, Sarah Binks, McClelland and Stewart Limited, Toronto, 1964, p. 137.

Appendices

APPENDIX A

The Commission's Terms of Reference

The following is the text of the Commission appointing Dr. Peter Pearse Commissioner under Part I of the Inquiries Act.

TO ALL TO WHOM these Presents shall come or whom the same may in anyway concern,

GREETING:

WHEREAS pursuant to the provisions of Part I of the Inquiries Act, chapter I-13 of the Revised Statutes of Canada, 1970, His Excellency the Governor General in Council, by Order in Council P.C. 1981-60 of the twelfth day of January in the year of Our Lord one thousand nine hundred and eighty-one has authorized the appointment of Our Commissioner therein and hereinafter named to examine into, report upon and make recommendations concerning the condition, management and utilization of the fisheries of the Pacific coast of Canada, excluding the arrangements between Canada and foreign nations governing fishing rights and conservation of stocks, and, without limiting the generality of the foregoing, to inquire into and report upon:

(a) the condition of the stocks of fish within Canada's jurisdiction off the Pacific coast, current levels of utilization and their relationship to optimum rates of use;

(b) the provisions for conservation, management, protection and development of the fish resources, including the protection of their tidal and non-tidal habitat and the enhancement of salmonid stocks;

(c) the structure and size of the commercial fishing fleet and the relationship between the capacity of the fleet to harvest fish and the optimum rates of harvesting the stocks;

(d) the policies and procedure for licensing commercial fishing, and for regulating the size and structure of the fishing fleet, including the charges to be levied by the Crown for fishing privileges; and

(e) the nature and amount of non-commercial fishing in tidal waters and non-tidal waters for salmonid species, its impact on the stocks and on the commercial fishery, and the policies and procedures for regulating non-commercial fishing.

NOW KNOW YOU that, by and with the advice of Our Privy Council for Canada, We do by these Presents nominate, constitute and appoint Dr. Peter Pearse, of the City of Vancouver, in the Province of British Columbia, to be Our Commissioner to conduct such inquiry.

TO HAVE, HOLD, exercise and enjoy the said office, place and trust unto the said Peter Pearse, together with the rights, powers, privileges and emoluments unto the said office, place and trust of right as by law appertaining during Our Pleasure.

AND WE DO HEREBY require Our said Commissioner to make recommendations directed toward ensuring that the public interest is protected in the legislation, policies, procedures and practices affecting the management and use of the fish resources and in particular:

(a) that fish resources and their use make the highest possible contribution to the economic and social development of the people of Canada, especially of those resident on the Pacific coast of Canada, recognizing that this contribution may be realized in economic, recreational and other social forms;

(b) that granting of fishing privileges to commercial, recreational and native food fishermen is conducive to proper management and conservation, to an equitable division of the catch among sectors, and to economic efficiency in the development of the commercial fishing fleet;

(c) that charges levied by the Crown for rights to fish commercially, or to land fish, are consistent with the value of the resources recovered, after fair and reasonable returns to commercial fishing enterprises;

(d) that vigor of the fishing industry is maintained and advanced, and its structure, ownership and control is consistent with industrial efficiency; and

(e) that provisions for management, enhancement and protection of the fish resources, for the administration of fisheries policy, and for consultation and communication between the Government of Canada and private groups involved in fishing activity are systematic and efficient.

AND WE DO HEREBY authorize Our said Commissioner

1. to adopt such procedures and methods as the Commissioner may from time to time deem expedient for the proper conduct of the inquiry;
2. to sit at such times and in such places in the Province of British Columbia or elsewhere in Canada as may be required;
3. to exercise all the powers conferred upon him by section 11 of the Inquiries Act;

4. to engage the services of such staff and technical advisers, including counsel, as he deems necessary or advisable to aid him in the conduct of the inquiry at such rates of remuneration and reimbursement as may be approved by Treasury Board;

5. to rent office space and facilities for public hearings in cooperation with the federal Department of Public Works as he may deem necessary at such rental rates as are consistent with the policies of the Department of Public Works;

AND WE DO FURTHER require Our said Commissioner to make a preliminary report to the Governor in Council not later than the first day of August, 1981, with recommendations dealing specifically with policies and procedures for regulating access to the fisheries and the development of the commercial fishing fleet, and also with the administration of licences and levies for commercial fishing privileges.

AND WE DO FURTHER require Our said Commissioner to make a final report to the Governor in Council, including such portions of the preliminary report as may be necessary, not later than the thirty-first day of December, 1981.

AND WE DO FURTHER require Our said Commissioner to file with the Dominion Archivist the papers and records of the inquiry as soon as reasonably may be after the conclusion of the inquiry.

AND WE DO FURTHER advise that Our said Commissioner be assisted by the officers and employees of the departments and agencies of the Government of Canada in any way the Commissioner may require for the conduct of the inquiry.

IN TESTIMONY WHEREOF, We have caused these Our Letters to be made Patent and the Great Seal of Canada to be hereunto affixed.

WITNESS:

Our Right Trusty and Well-beloved Edward Richard Schreyer, Chancellor and Principal Companion of Our Order of Canada, Chancellor and Commander of Our Order of Military Merit upon whom We have conferred Our Candian Forces' Decoration, Governor General and Commander-in-Chief of Canada.

AT OUR GOVERNMENT HOUSE, in Our City of Ottawa, this third day of March in the year of Our Lord one thousand nine hundred and eighty-one and in the thirtieth year of Our Reign.

BY COMMAND,

(signed)
Governor General of Canada
Deputy Registrar General
Deputy Attorney General

APPENDIX B

List of Exhibits and Participants in the Commission's Public Hearings

exhibit number	registered participant	witness	presentation	date
1.	Order in Council P.C. 1981-60		Vancouver	Mar. 2, 1982
1a	Order in Council P.C. 1982-262		Vancouver	Apr. 27, 1982
2.	The Canada Gazette, No. 6, Volume 115, Ottawa, February 7, 1981.		Vancouver	Mar. 2, 1982
3a	Copy of Notice Published in Newspapers		Vancouver	Mar. 2, 1982
3b	List of newspapers, with dates of publication			
4a	Public Hearing Procedures		Vancouver	Mar. 2, 1982
4b	Procedures for the Public Hearings, revised May 29/81			
Initial Appearances				
5.	G. Cadorin	G. Cadorin	Nanaimo	Apr. 8, 1981
6.	Ganges Fishermen's Association	R. Coulter	Nanaimo	Apr. 8, 1981
7.	R. Larson	R. Larson	Nanaimo	Apr. 8, 1981
8.	Nanaimo and District Fish and Game Protective Association	W.R. Harling	Nanaimo	Apr. 8, 1981
9.	J.G. Sanderson	J.G. Sanderson	Nanaimo	Apr. 8, 1981
10.	Concerned Fisherman's Committee of the Sunshine Coast	K.H. Griffith	Nanaimo	Apr. 8, 1981
11.	Nanaimo Indian Band	J. Brown O. Thomas E. Light	Nanaimo	Apr. 8, 1981
12.	R. Arnet	R. Arnet	Port Alberni	Apr. 10, 1981
13.	Regional District of Alberni-Clayoquot	A.E. Kilpatrick P. Barr R. Burley P. Garcia	Port Alberni	Apr. 10, 1981
14.	Ucluelet-Port Albion Chamber of Commerce	R. Davison	Port Alberni	Apr. 10, 1981

exhibit number	registered participant	witness	presentation	date
15.	Nuu-chah-nulth Tribal Council	G. Watts A. Franks	Port Alberni	Apr. 10, 1981
16.	A. Vanderhorst	A. Vanderhorst	Port Alberni	Apr. 10, 1981
17.	A. Gallaugher	A. Gallaugher	Prince Rupert	Apr. 22, 1981
18.	S.R. Brinton	S.R. Brinton	Prince Rupert	Apr. 22, 1981
19.	Prince Rupert Fish Exchange	G. Lindquist	Prince Rupert	Apr. 22, 1981
20.	D.W. Ellis	D.W. Ellis	Prince Rupert	Apr. 22, 1981
21.	Northern Trollers' Association	J. Broadhead M. Hearne M. Forand	Prince Rupert	Apr. 22, 1981
22. 22a 22b	United Fishermen and Allied Workers Union, Shoreworkers Local #31	C. Wyllie B. Hale B. Thompson J. Hartney J. Thorkelson	Prince Rupert	Apr. 23, 1981
23.	Prince Rupert Fishing Vessel Owners Association	G. Haugan D. Murray	Prince Rupert	Apr. 24, 1981
24.	United Fishermen and Allied Workers Union, Local #37	M. Darnell	Prince Rupert	Apr. 24, 1981
25.	Prince Rupert Rowing and Yachting Club	O. Stuart	Prince Rupert	Apr. 24, 1981
26.	G. Logan	G. Logan	Prince Rupert	Apr. 24, 1981
27.	W. Markin	W. Markin	Vancouver	Apr. 27, 1981
28.	D. Pepper	D. Pepper	Vancouver	Apr. 27, 1981
29.	Fraser River Coalition	W. Paulik J. Vance	Vancouver	Apr. 27, 1981
30.	B.C. Wildlife Federation	B. Otway D. McDermid	Vancouver	Apr. 28, 1981
31.	A. Kaario	A. Kaario L. Iverson	Vancouver	Apr. 28, 1981
32.	Port Coquitlam and District Hunting and Fishing Club	H. Prante	Vancouver	Apr. 28, 1981
33.	D.R. Boyes	D.R. Boyes	Vancouver	Apr. 28, 1981
34.	K. Anders	K. Anders	Vancouver	Apr. 28, 1981
35.	O.B. Ogmundson	O.B. Ogmundson	Victoria	May 13, 1981
36.	Gulf Islands Independent Fishermen's Association	A.H. Reynolds	Victoria	May 13, 1981
37. 37a 37b 37c	Canadian Federation of Independent Business	B. Morrison	Victoria	May 13, 1981
38.	P.D. Hancock	P.D. Hancock	Victoria	May 13, 1981
39.	A. Merriman	A. Merriman	Victoria	May 14, 1981
40.	The Cowichan Estuary Preservation Society	B. Meagher	Victoria	May 14, 1981
41.	A.D. de Leeuw	A.D. de Leeuw	Victoria	May 14, 1981
42.	Laredo Charters Ltd.	J. Chudyk	Victoria	May 14, 1981

exhibit number	registered participant	witness	presentation	date
43.	J.K. Watson	J.K. Watson	Victoria	May 14, 1981
44.	H. and L. Doerksen	H. Doerksen	Victoria	May 15, 1981
44a		L. Doerksen		
44b		D. Doerksen		
44c				
45.	The Royal Canadian Navy Anglers Association	R.J. Rogerson	Victoria	May 15, 1981
46.	A.H. Meadows	A.H. Meadows	Victoria	May 15, 1981
47.	Amalgamated Conservation Society	S. D'Agati W. Zaccarelli R.J. Rogerson	Victoria	May 15, 1981
48.	The Steelhead Society of British Columbia	J. Counts	Terrace	May 21, 1981
48a		J. Culp		
48b		M. Whateley		
49.	Kitamaat Village Council	G. Amos T. Robinson	Terrace	May 21, 1981
50.	Skeena Protection Coalition of Terrace	E. Hamilton	Terrace	May 21, 1981
51.	D. E. Dobyns	D.E. Dobyns	Terrace	May 21, 1981
52.	Gitksan-Carrier Tribal Council	A. Joseph	Hazelton	May 23, 1981
52a		C. White		
52b		B. Patsey		
52c		R. Jones		
52d		R. Morgan T. Brown P. Grant S. Clark P. Williams G. Sebastian M. Morrell R. Overstall		
53.	Save the Bulkley	W. Metcalfe	Hazelton	May 23, 1981
53a		H. Kusselbrink P. Moss		
54.	Fraser River Gillnetters Committee	J. Anderson W. Probert P. Carlson	Delta	May 25, 1981
55.	G. Dalum	G. Dalum	Delta	May 25, 1981
56.	Original "B" Fishermen's Association	W.G. Thomson	Delta	May 25, 1981
57.	Richmond Rod and Gun Club	J.L. Hargrove	Delta	May 25, 1981
58.	The Columbian Co. Ltd.	R.D. Taylor	Delta	May 26, 1981
59.	Fish Incorporated	J. Margetis	Delta	May 26, 1981
60.	B. Alden	B. Alden W. Paulik	Delta	May 26, 1981
61.	E. and W. Burnell	E. Burnell W. Burnell	Delta	May 26, 1981
62.	F. and L. Bublé	F. Bublé L. Bublé	Delta	May 27, 1981

exhibit number	registered participant	witness	presentation	date
63. 63a	Fisheries Association of B.C.	J.N. Spitz E. Safarik Jr. E.L. Harrison B. Buchanan S. Ishigigoo	Delta	May 27, 1981
64.	Ocean Fisheries	E. Safarik	Delta	May 27, 1981
65. 65a 65b	S. Jovick	S. Jovick	Delta	May 27, 1981
66. 66a	Greenpeace Foundation of Canada	P. Moore	Delta	May 28, 1981
67. 67a 67b	D. Williams	D. Williams	Delta	May 28, 1981
68.	D. Dawson	D. Dawson	Delta	May 28, 1981
69.	T.G. Hodgson	T.G. Hodgson	Delta	May 28, 1981
70.	Pacific Gillnetters Association	S.I. Taylor D. McEachern D. Ekroth M. Forest	North Vancouver	June 3, 1981
71.	British Columbia Chamber of Commerce	O.I. Eidsvik B. McDonald	North Vancouver	June 3, 1981
72.	Council of B.C. Yacht Clubs	D. Simpson	North Vancouver	June 3, 1981
73.	Canadian Fishing Company	D. Miller	North Vancouver	June 4, 1981
74.	E. Tassonyi	E. Tassonyi	North Vancouver	June 4, 1981
75. 75a	Oweekeno Indian Band	C. Hanuse D. Smith	North Vancouver	June 4, 1981
76.	Pacific Coast Salmon Seiners Association	K. Brillon C. Doyle T. Assu	North Vancouver	June 4, 1981
77. 77a	Pacific Trollers Association	G. Bisaro D. Williams J. Garcia	North Vancouver	June 5, 1981
78.	T. Howard	T. Howard	North Vancouver	June 5, 1981
79.	E. Pinkerton	E. Pinkerton	North Vancouver	June 5, 1981
80.	The Sechelt Nation		Powell River	June 11, 1981
81.	Tidal Rush Marine Farms Ltd.	B. Hope	Powell River	June 11, 1981
82.	Powell River Anti-Pollution Association	M. Rossander F. Jenkinson J. Michael M. Conway-Brown	Powell River	June 11, 1981
83.	Campbell River, Cape Mudge, Comox/Qualicum Branches of the Native Brotherhood of B.C. (The Letwiltouch, Komoux and Kwalikum People)	R. Naknakin H. Assu S. Assu J. Rivard G. Quoksister R. Clifton	Campbell River	June 12, 1981

exhibit number	**registered participant**	**witness**	**presentation**	**date**
84. 84a	United Fishermen and Allied Workers Union, Local #23	F. Pearson	Campbell River	June 12, 1981
85.	Gulf Trollers' Association	B. McLeod	Campbell River	June 12, 1981
86.	T. Northcott	T. Northcott	Campbell River	June 13, 1981
87.	Monenco Consultants Pacific Ltd.	D.R. Wilson	Campbell River	June 13, 1981
88. 88a 88b	B. Thornton	B. Thornton	Campbell River	June 13, 1981
89. 89a 89b	Kwakiutl District Council	E. Willie F. Willie B. Joseph B. Ambers B. Duncan	Port Hardy	June 19, 1981
90.	Kwakiutl Band	R. Wilson	Port Hardy	June 19, 1981
91.	Fisheries Council of Canada	K.M. Campbell	North Vancouver	June 23, 1981
92.	Cariboo Lumber Manufacturers' Association	J.M. Taylor B. Howard	North Vancouver	June 23, 1981
93. 93a 93b 93c 93d 93e	R. and L. Long	G.R. Long L. Long R. Bose	North Vancouver	June 23, 1981
94.	Fishing Vessel Owners' Association of British Columbia	L.M. Souza J. Brajcich J. Lenic	North Vancouver	June 24, 1981
95.	Association of British Columbia Professional Foresters	J.W. Toovey W.A. Hopewood P.W. Ackhurst	North Vancouver	June 24, 1981
96.	Association of Professional Biologists of British Columbia	G. Gaine	North Vancouver	June 24, 1981
97. 97a	Sport Fishing Institute of British Columbia	D.A. Elliott G. Kristianson R. Peterson	North Vancouver	June 25, 1981
98.	British Columbia Packers Limited	E.L. Harrison B. Buchanan D. Nelson P. Todd R. Shelley	North Vancouver	June 25, 1981
99.	L. Straight	L. Straight	North Vancouver	June 25, 1981
100. 100a 100b 100c	British Columbia Development Corporation	F. Culbert P. Breikss D. Sinclair	North Vancouver	June 26, 1981
101.	Vancouver Shell Fish and Fish Co. Ltd.	N.E. Safarik	North Vancouver	June 26, 1981
102.	Salmonid Enhancement Task Group	G. McKnight J. Sewid T. Murray R. Lotzkar	North Vancouver	June 26, 1981

exhibit number	registered participant	witness	presentation	date
103.	Progressive Conservative Caucus, Pacific and Inland Fisheries	T. Siddon, M.P. P. Carney, M.P.	North Vancouver	June 30, 1981
104.	British Columbia Forest Products Limited	W.G. Burch S. Techy B. Willington	North Vancouver	June 30, 1981
105.	C.W. Ross	C.W. Ross	North Vancouver	June 30, 1981
106. 106a	Squamish Indian Band	B. Williams D. Jacobs R. Williams	North Vancouver	June 30, 1981
107.	B.C. Wildlife Federation	H. English	Victoria	July 8, 1981
108.	C.R. White	C.R. White	Victoria	July 8, 1981
109. 109a	W.R. Perrey	W.R. Perrey	Victoria	July 8, 1981
110.	Marine Trades Association of British Columbia	B. Gibson	Victoria	July 9, 1981
111.	The Honourable Jack Davis	J. Davis	Victoria	July 9, 1981
112. 112a	A. Reder	A. Reder W.F. Dyke	Victoria	July 9, 1981
113. 113a 113b 113c	Victoria Charter Boat Association	R.C.K. Peers R. Wright J. Gilbert	Victoria	July 13, 1981
114.	Wilson and Lenfesty Ltd.	D. Breel	Victoria	July 13, 1981
115.	Tackle Manufacturers Association of Southern Vancouver Island	B.J. Scott B. Hodson T. Davis J.K. Homer J. Gaunt J. Gilbert	Victoria	July 13, 1981
116. 116a	Allied Boating Association of Canada	D. Matheson	Victoria	July 14, 1981
117.	Victoria Fish and Game Protective	A. Playfair A. McGregor J. Clements	Victoria	July 14, 1981
118.	Sidney Angler's Association	T.C. Davis	Victoria	July 14, 1981
119.	D.W. Munro, M.P.		Victoria	July 14, 1981
120.	Pacific Coast Fishing Vessel Owners' Guild	E. Wickham	Victoria	July 15, 1981
121.	A. Gallaugher	A. Gallaugher	Prince Rupert	July 21, 1981
122.	Bella Coola Band Council	L. Pootlass S. Schooner M. Hall D. Schooner R. Andy	Prince Rupert	July 21, 1981
123.	B. Pattinson	B. Pattinson	Prince Rupert	July 21, 1981
124.	Prince Rupert Fish Exchange	J. Rowbottom	Prince Rupert	July 22, 1981

exhibit number	registered participant	witness	presentation	date
125. 125a 125b	Masset Band Council	F. Collinson T. Greene	Prince Rupert	July 22, 1981
126.	W.A. Lenz	W.A. Lenz	Prince Rupert	July 22, 1981
127.	Nechako Neyenkut Society	L. Burgener	Prince Rupert	July 23, 1981
128.	Prince Rupert Fishermen's Co-operative Association	M. Cat A. Laing P. Greene N. Marshall D. Proctor B. Shumka	Prince Rupert	July 23, 1981
129. 129a 129b 129c 129d 129e	Nishga Tribal Council	J. Gosnell R. Robinson H. Haldane H. Doolan P. McCart M. Shaffer G. Holman H. Stevens W. McKay J. Gosnell D. Rosenbloom	Prince Rupert	July 24, 1981
130. 131.	The Anglican Church of Canada, The Anglican Diocese of Caledonia, The Anglican Diocese of Yukon	P. Hamel H. Haldane D. Bobs I. MacKenzie J. Spear J. Stokes F. Lewis	Prince Rupert	July 24, 1981
132.	Institute of Naval Architects of British Columbia	L. Coward D. Moore B. MacDonald	Vancouver	July 27, 1981
133.	Union of B.C. Indian Chiefs	S. Terry W. Haimila	Vancouver	July 27, 1981
134.	S. Fuller	S. Fuller	Vancouver	July 27, 1981
135.	Council of Forest Industries of British Columbia	G. Ainscough P. Gilbert J. Bonnerman M. Mosher B. Sen R. Urban	Vancouver	July 28, 1981
136.	New Democratic Party Caucus	T. Miller, M.P.	Vancouver	July 28, 1981
137.	Western Canada Wilderness Committee	P. George	Vancouver	July 28, 1981
138. 138a	United Fishermen and Allied Workers Union	J. Nichol G. Hewison W. Procopation	Vancouver	July 29, 1981
139.	Central Native Fishermen's Cooperative	A. Dixon	Vancouver	July 29, 1981
140.	D. Ferguson	D. Ferguson	Vancouver	July 30, 1981

exhibit number	registered participant	witness	presentation	date
141a 141b	Native Brotherhood of British Columbia Volume I Volume II	E. Newman R. Naknakin J. Rivard D. Pepper T. Knowles B. Clifton V. Kramner C. Atleo G. Joseph	Vancouver	July 30, 1981
142.	Heiltsuk Tribal Council	E. Newman A. Dixon C. Martin D. Halsted	Vancouver	July 30, 1981
143. 143a	Department of Fisheries and Oceans (Licensing Brief)	C.W. Shinners A. Gibson P. Murray W. Grider D. Reid D. Carson	Vancouver	July 31, 1981
144.	B.C. Wildlife Federation	B. Otway D. McDermid	Vancouver	Dec. 14, 1981
145.	The Truck Loggers' Association	D. Hanuse N. Jacobsen	Vancouver	Dec. 14, 1981
146.	MacMillan Bloedel Limited	G. Ainscough D. Handley W. Pollard	Vancouver	Dec. 15, 1981
147. 147a 147b 147c 147d 147e	Richmond Anti-Pollution Association	S. Bourque	Vancouver	Dec. 15, 1981
148.	North-Pacific International Chapter of the American Fisheries Society	R. Peterson C. Chestnut	Vancouver	Dec. 15, 1981
149.	H. Burrow	H. Burrow	Victoria	Dec. 18, 1981
150.	B.M. Rowe	B.M. Rowe	Victoria	Dec. 18, 1981
151.	N.D.P. National Caucus	J. Fulton, M.P.	Vancouver	Dec. 22, 1981
152.	Aluminum Company of Canada, Ltd.	W.J. Rich	Vancouver	Dec. 22, 1981
153.	Council for Yukon Indians	J. Jack D. Grady	Whitehorse	Jan. 13, 1982
154.	Government of Yukon	Hon. D. Lang	Whitehorse	Jan. 13, 1982
154a	Commission Exhibit		Whitehorse	Jan. 13, 1982
155.	Yukon Conservation Society	T. Munson	Whitehorse	Jan. 13, 1982
156. 156a	Nimpkish Indian Band	B. Cramner M. Jackson M. Weinstein C. Sturmanis R. Kellerhals J. Heckman C. Cook R. Cramner G. Alfred	Vancouver	Jan. 15, 1982

ISSUE HEARINGS

exhibit number	registered participant	witness	presentation	date
Habitat Management				
157.	Department of Fisheries and Oceans	C.W. Shinners F.C. Boyd H.D. Smith I. Birtwell	Vancouver	Feb. 8, 1982
158.	Pacific Trollers Association	G. Dalum	Vancouver	Feb. 9, 1982
159.	Council of Forest Industries of British Columbia	G. Ainscough M. Mosher B. Sen R. Willington C. Wilson P. Gilbert	Vancouver	Feb. 9, 1982
160. 160a	Nuu-chah-nulth Tribal Council	P. George J. Woodward	Vancouver	Feb. 9, 1982
161.	United Fishermen and Allied Workers Union, Local #27, Bella Coola	B. Lande	Vancouver	Feb. 9, 1982
Salmonid Enhancement and Aquaculture				
162.	Department of Fisheries and Oceans	W. Falkner A. Lill K. Sandercock D. Deans R. Morley D. Inell	Vancouver	Mar. 2, 1982
163.	British Columbia Development Corporation	F. Culbert S. Sydneysmith D. Sinclair	Vancouver	Mar. 3, 1982
164.	Tidal Rush Marine Farms Ltd	B. Hope	Vancouver	Mar. 3, 1982
165.	Powell River Anti-Pollution Association Salmonid Enhancement Committee	D. Lawson M. Rossander	Vancouver	Mar. 3, 1982
166.	Pacific Trollers Association	P. Koreski R. Fowler	Vancouver	Mar. 3, 1982
Indian Fisheries				
167.	Department of Fisheries and Oceans	R. McLeod C.W. Shinners F.E.A. Wood F.J. Fraser D. Brock D. Deans	Vancouver	Mar. 8, 1982
168.	Union of B.C. Indian Chiefs (Sto:lo Nation)	M. Point S. Douglas R. John M.L. Andrews	Vancouver	Mar. 9, 1982
169.	B.C. Wildlife Federation	D. McDermid	Vancouver	Mar. 9, 1982
170.	West Coast Abalone Harvesters Association	R. Harrington	Vancouver	Mar. 9, 1982
171.	Pacific Trollers Association	G. Dalum	Vancouver	Mar. 9, 1982

exhibit number	registered participant	witness	presentation	date
Recreational Fisheries				
172.	Department of Fisheries and Oceans	C.W. Shinners D. Brock B. Masse N. Lemmen D. Schutz	Victoria	Mar. 17, 1982
173. 173a	B.C. Wildlife Federation	H. English D. McDermid	Victoria	Mar. 19, 1982
174.	Amalgamated Conservation Society	W. Zaccarelli S. D'Agati	Victoria	Mar. 19, 1982
175.	Victoria Charter Boat Association	R.C.K. Peers R. Wright J. Gilbert	Victoria	Mar. 19, 1982
176.	The Royal Canadian Navy Anglers Association	R. Rogerson	Victoria	Mar. 22, 1982
177.	Victoria Fish & Game Protective Association	A. Playfair A. McGregor	Victoria	Mar. 22, 1982
178.	Pacific Trollers Association	G. Dalum	Victoria	Mar. 22, 1982
179.	A. Reder	A. Reder	Victoria	Mar. 22, 1982
180.	Sport Fishing Institute of British Columbia	D.A. Elliott C. Smith	Victoria	Mar. 23, 1982
181.	Sidney Angler's Association	T.C. Davis	Victoria	Mar. 23, 1982
Research				
182.	Department of Fisheries and Oceans	C.W. Shinners R. Beamish H. Tsuyuki F.E.A. Wood J. Stockner D. Schutz	Nanaimo	Mar. 30, 1982
183.	D. Pepper	D. Pepper	Nanaimo	Mar. 30, 1982
Licensing, Inspection and Product Regulation				
184.	Department of Fisheries and Oceans	C.W. Shinners D. Wilson C. Campbell A. Gibson D. Carson	Vancouver	Apr. 5, 1982
185. 185a 185b	D. Dawson	D. Dawson	Vancouver	Apr. 5, 1982
186.	Fisheries Association of B.C.	J. Spitz E. Safarik Jr.	Vancouver	Apr. 6, 1982
187.	The Masset Crabbers	B. Wylie	Vancouver	Apr. 6, 1982
188.	D.W. Ellis	D.W. Ellis R. Arnet	Vancouver	Apr. 7, 1982
189.	T. Hodgson	T. Hodgson	Vancouver	Apr. 7, 1982

exhibit number	registered participant	witness	presentation	date
Enforcement				
190.	Department of Fisheries and Oceans	D. Wilson	Vancouver	Apr. 20, 1982
		A. Gibson		
		F. Fraser		
		D. Brock		
191.	Fraser River Coalition	W. Paulik	Vancouver	Apr. 21, 1982
191a		J. Vance		
192.	United Fishermen and Allied Workers Union, Local #23	L. Iverson	Vancouver	Apr. 21, 1982
Administration and Consultative Arrangements				
193.	Department of Fisheries and Oceans	D.D. Tansley	Vancouver	Apr. 27, 1982
193a		C.W. Shinners		
		W. Falkner		
194.	Pacific Coast Fishing Vessel Owners' Guild	E. Wickham	Vancouver	Apr. 28, 1982
195.	West Coast Abalone Harvesters Association	E. Wickham	Vancouver	Apr. 28, 1982
		R. Harrington		
		J. McGuire		
196.	John Margetis Fish Incorporated	J. Margetis	Vancouver	Apr. 28, 1982
197.	D. Pepper	D. Pepper	Vancouver	Apr. 29, 1982
198.	Native Brotherhood of British Columbia	E. Newman	Vancouver	Apr. 29, 1982
198a		J. Rivard		
198b		B. Clifton		
		W. McKay		
		R. Duncan		
199.	1982 British Columbia Tidal Waters Sport Fishing Guide		Vancouver	Apr. 29, 1982
200.	Conflict and Opportunity: Toward a New Policy For Canada's Pacific Fisheries. Preliminary Report Of The Commission, November, 1981.		Vancouver	Apr. 29, 1982

Communities in which informal meetings were held:

Location	Date	Location	Date
Masset	March 27, 1981	Ahousaht	May 11, 1981
Queen Charlotte City	March 28, 1981	Kispiox (Hazelton)	May 22, 1981
Lillooet	April 4, 1981	Sechelt	June 10, 1981
Alert Bay	April 14, 1981	Stuart Island	June 15, 1981
Bella Coola	May 6, 1981	Pedder Bay	July 10, 1981
Oweekeno	May 6, 1981	Lytton	July 17, 1981
Bella Bella	May 7, 1981	Whitehorse	January 12, 1982
Ucluelet	May 9, 1981	Prince Rupert	February 1, 1982

APPENDIX C

List of Supplementary Documents Supplied to the Commission Outside of the Formal Public Hearing Process

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number	submitted by	from	date
S - 01	T. Burns	Victoria	—
S - 02	The Corporation of The Village of Hazelton	Hazelton	May, 1981
S - 03	R. Burley, Mayor	Ucluelet	May 9, 1981
S - 04	Duncan-Cowichan Chamber of Commerce (Economic Development Committee)	Duncan	a) May 13, 1981 b) Nov. 24, 1981
S - 05	D. Aberley	Hazelton	May 22, 1981
S - 06	Kitwancool	Kitwanga	May 22, 1981
S - 07	B.L. Howe	Prince Rupert	June 19, 1981
S - 08	Lytton Indian Band	Lytton	July, 1981
S - 09	Regional District of Kitimat-Stikine	Terrace	July, 1981
S - 10	Nicola Valley Area Council	Merritt	a) July, 1981 b) Aug., 1981
S - 11	British Columbia Packers Limited	Vancouver	Aug. 18, 1981
S - 12	Pacific Salmon Society	Vancouver	Sep. 14, 1981
S - 13	J. Culp	Terrace	Sep. 22, 1981
S - 14	Salmonid Enhancement Task Group	Vancouver	Sep. 23, 1981
S - 15	Squamish Indian Band Council	North Vancouver	Oct. 9, 1981
S - 16	E. Neish	Victoria	Oct. 31, 1981
S - 17	D.E. Dobyns	Brentwood Bay	a) Nov. 30, 1981 b) Dec. 30, 1981
S - 18	Vancouver Shell Fish & Fish Co. Ltd.	Vancouver	Dec. 9, 1981
S - 19	H.G. Doerksen and Family	Victoria	Dec. 15, 1981
S - 20	C.F.V. Sales Ltd.	Delta	Dec. 18, 1981
S - 21	J. Manly, M.P.	Ottawa	Dec. 18, 1981
S - 23	British Columbia Forest Products Limited	Vancouver	Dec. 31, 1981
S - 24	W.R. Perrey	Vancouver	Jan. 5, 1982

number	submitted by	from	date
S - 25	The Regional Aquaculture Association	Nanaimo	a) Jan. 6, 1982 b) Jan. 6, 1982
S - 26	Yukon Fish & Game Association	Whitehorse	Jan. 8, 1982
S - 27	S. Zablosky	Delta	Feb. 2, 1982
S - 28	Associated Chambers of Commerce of Vancouver Island	Nanaimo	Feb. 2, 1982
S - 29	Co-Operative Fishermen's Guild	Prince Rupert	May 15, 1981
S - 30	South Island District Council	Brentwood Bay	Jan. 18, 1982
S - 31	United Native Nations, Prince Rupert Local #115	Prince Rupert	Jan. 25, 1982
S - 32	Lett Marine Consultants Ltd.	Halifax, N.S.	Jan. 26, 1982
S - 33	Yukon Fishing Safaris	Whitehorse, Y.T.	Feb. 3, 1982
S - 34	British Columbia Packers Limited	Vancouver	Aug. 18, 1981
S - 35	Mr. and Mrs. J. Caddy	Port Alberni	May 28, 1981
S - 36	Deep Sea Trawlers Association of B.C.	Surrey	Jan. 14, 1982
S - 37	Pacific Trollers Association	Vancouver	Jan. 28, 1982
S - 38	Pacific Trollers Association	Vancouver	Jan. 28, 1982
S - 39	J.K. Watson	Victoria	Mar., 1982
S - 40	MacMillan Bloedel Limited	Vancouver	Mar. 23, 1982
S - 41	E. McGuire	Port Coquitlam	Mar. 25, 1982
S - 42	Salmonid Enhancement Task Group	Vancouver	Apr. 22, 1982
S - 43	Kwakiutl District Council	—	Apr. 26, 1982
S - 44	Nuu-chah-nulth Fishermen's Association	Port Alberni	Mar. 26, 1982

Research Documents Prepared for the Commission on Pacific Fisheries Policy

R - 1 Blake A. Campbell, "Volume and Value of Landings of Fish Reported By British Columbia Commercial Fishermen 1961 - 1980." 1981.

R - 2 Will McKay Consultants, "The Indian Fishermen's Emergency Assistance Program." 1981.

R - 3 Environmental and Social Systems Analysts Ltd., "An Assessment of Stocks and Management Problems of the Commercial Fisheries of Canada's Pacific Coast." 1982.

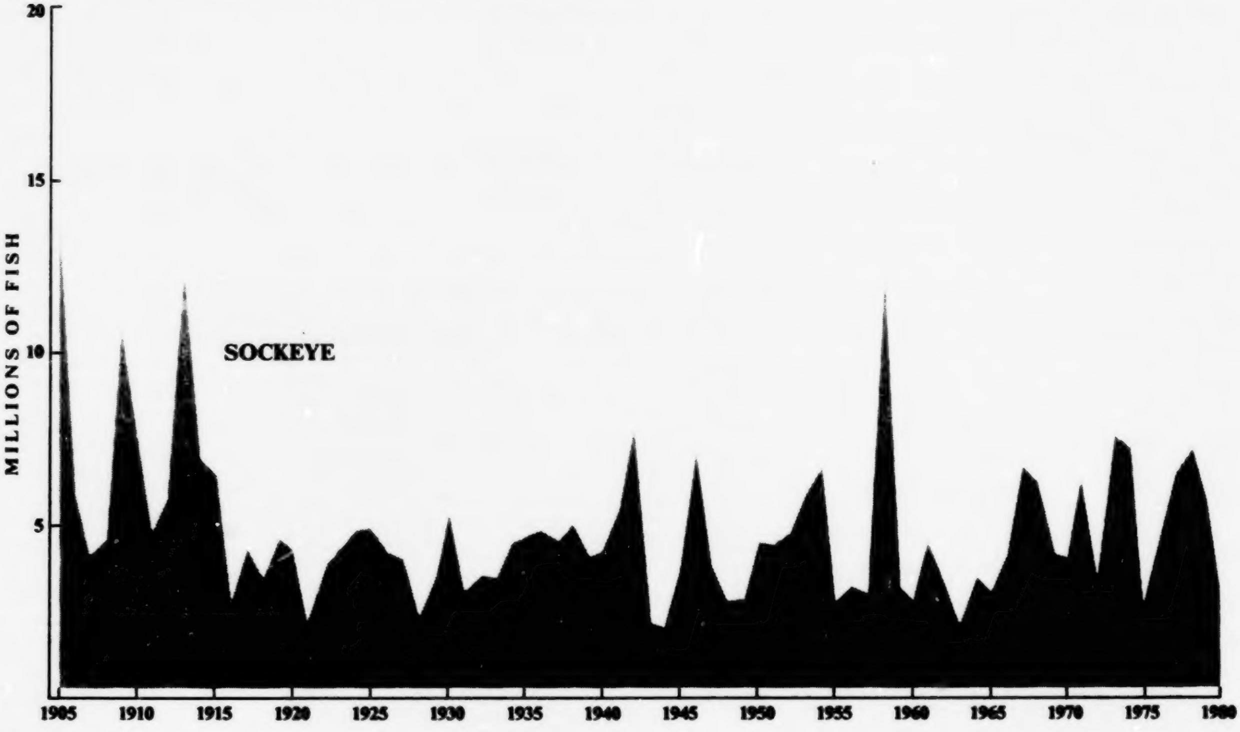
R - 4 Richard Schwindt, "Industrial Organization of the Pacific Fisheries." 1982.

APPENDIX D

Current and Optimum Catch and Escapement Estimates For Salmon

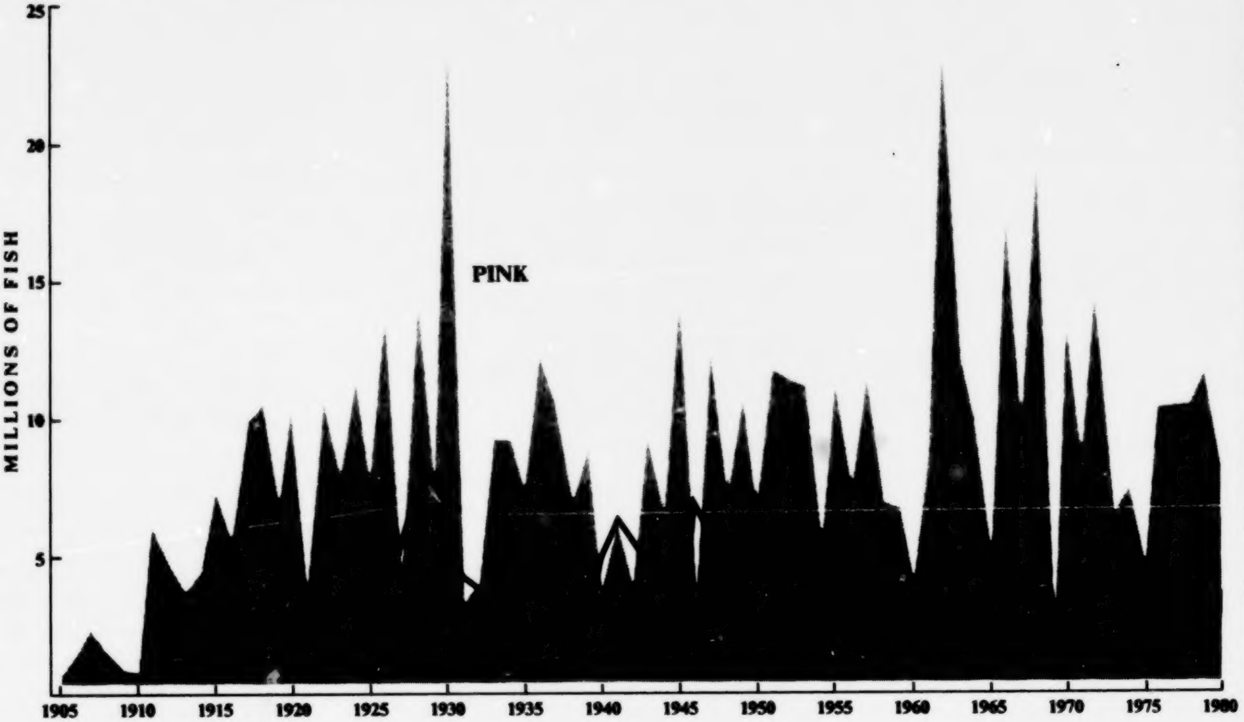
Estimates of total production from Canadian salmon stocks should account for commercial harvests by domestic and foreign fishermen, catches in the sport and Indian fisheries, and escapements. Complete data on these components of production have only recently begun to become available, and are not equally reliable, so are inadequate for measuring long-term trends in stocks. We can, however, draw some inferences from the records of commercial landings. Figures D-1, D-2 and D-3 show the commercial landings of sockeye, chum, pink, coho and chinook salmon, since 1905. The trends in these figures provide some perspective for the following commentary and data on the condition of the stocks of each species.

Figure D-1 Commercial landings of sockeye salmon since 1905



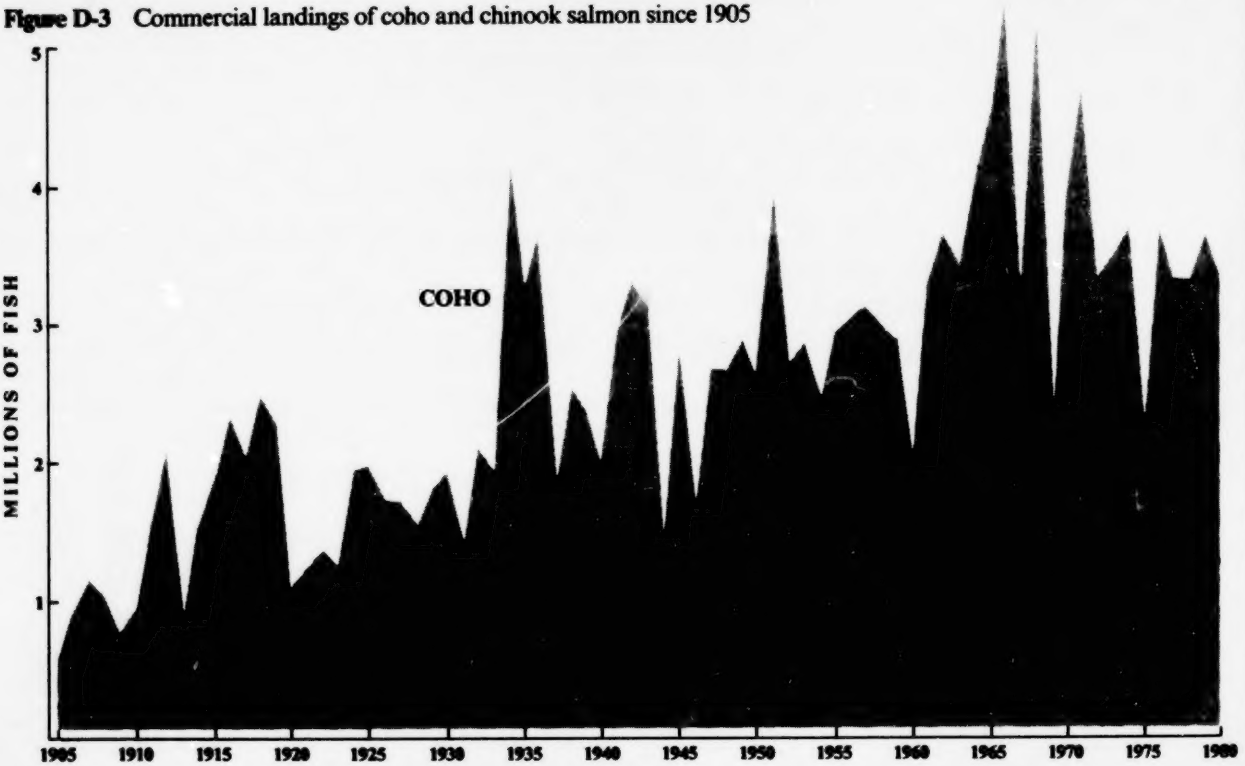
Source: See Footnote 1.

Figure D-2 Commercial landings of chum and pink salmon since 1905[a]



[a] Data on Chum landings before 1910 not available.

Figure D-3 Commercial landings of coho and chinook salmon since 1905



The findings on the status of fish stocks presented in the accompanying tables are in large part a result of investigations sponsored by the Commission and conducted by a team of biologists at the University of British Columbia, who were asked to make an independent assessment of the data relating to existing natural stock conditions, trends and yield capabilities.[2] They have assembled the available historical data on total catches, escapements and other variables and, with the cooperation of biologists from the Department of Fisheries and Oceans, have analyzed them to infer as much as possible about fish populations and their potentials. It should be noted that the catch and escapement estimates in these tables relate only to stocks originating in Canadian rivers.

Sockeye

Table D-1 Current and optimum catch and escapement of sockeye salmon originating in Canadian rivers estimated by major production area

area	catch			escapement		
	current	optimum		current	optimum	
		estimate	(range)[a]		estimate	(range)[b]
			(thousands of fish)			
Nass River	317	350	(240 - 360)	195	181	(120 - 360)
Skeena River	834	800	(750 - 1,000)	820	868	(600 - 1,500)
Central coast	280	283	(220 - 350)	100	200	(100 - 400)
Rivers/Smith Inlets	480	1,200	(1,000 - 1,500)	390	500	(400 - 2,000)
Johnstone Strait	44	unknown	unknown	unknown	unknown	unknown
Fraser River	4,460	8,000	(7,000 - 11,000)	1,370	4,000	(2,000 - 8,000)
S.W. Vancouver Island	600	500	(150 - 1,000)	260	300	(100 - 1,000)
total:	7,015	11,133+	(9,360+ - 15,210+)	3,135+	6,049+	(3,320+ - 13,260+)

[a] Because of uncertainties regarding early escapement counts, stocks being exploited in mixed-stock fisheries and difficulties in treating substocks separately, the estimated ranges are quite wide.

[b] The wide range in the estimates of optimum escapement reflect the imprecise knowledge about spawner-recruitment relationships in the stocks and uncertainty about the optimum rates of exploitation.

Table D-1 shows that the optimum average annual sockeye catch is slightly in excess of 11 million fish, substantially more than the 7 million now taken. The current and optimum escapement estimates indicate that in order to achieve the optimum catch of over 11 million sockeye, the annual escapement will have to be almost doubled from present levels of 3.1 million to slightly over 6.0 million.

In most areas the current and optimum catches are not badly out of balance, but there are two significant exceptions: Rivers-Smith Inlets and Fraser River. In these two areas, estimates indicate that catches could be increased from current levels of about 4.9 million fish to approximately 9.2 million fish, a potential increase of 4.3 million fish, representing some 60 percent of the current average annual sockeye harvests. These estimates are generally consistent with those of a recent independent study of Fraser River sockeye production and potential.[3]

Chum

Table D-2 Current and optimum catch and escapement of chum salmon originating in Canadian rivers estimated by major production area

area	catch			escapement		
	current	optimum		current	optimum	
		estimate	(range)[a]		estimate	(range)[b]
			(thousands of fish)			
Queen Charlotte, North	8	unknown	unknown	78	unknown	unknown
Queen Charlotte, South	85	200	(100 - 300)	155	600	(206 - 1,000)
Nass River	112	unknown	unknown	53	unknown	unknown
Central coast	470	808	(400 - 800)	380	684	(400 - 1,000)
Johnstone Strait	94	250	(150 - 250)	242	210	(150 - 350)
Strait of Georgia	246	488	(200 - 500)	472	415	(300 - 500)
Fraser River	341	1,200	(600 - 2,000)	435	1,000	(600 - 3,000)
S.W. Vancouver Island	58	217	(150 - 300)	471	372	(300 - 500)
N.W. Vancouver Island	48	100	(80 - 120)	117	150	(100 - 200)
total:	1,462	3,263+	(1,680+ - 4,270+)	2,403	3,431+	(2,056+ - 6,550+)

[a] The wide range in estimates reflects uncertainties about the optimum escapements, poor escapement data and anticipated difficulties in establishing terminal fisheries that could effectively harvest surpluses.

[b] The wide range in the estimates, particularly in the Fraser system, reflects uncertainty about optimum exploitation rates and the spawner-recruitment relationships.

Table D-2 shows that the optimum average annual chum catch is in excess of 3.2 million fish, over twice the present catch of approximately 1.5 million. For all areas, the estimated optimum catch is substantially greater than what is being taken now, with almost half of the potential for increased production lying in the Fraser River system.

Those areas in which the potential for increased chum catches are shown to be greatest also require substantial increases in spawning escapement. Coastwide, escapements need to be increased from the present 2.4 million to more than 3.4 million. Increasing Fraser River escapements to more than double the present levels (1 million as opposed to 435 thousand) could yield a more than threefold increase in catch. Substantial scope for increased escapement in the Queen Charlotte south and Central coast areas is also indicated.

Pink

Table D-3 Current and optimum catch and escapement of pink salmon originating in Canadian rivers estimated by major production area

area	catch			escapement		
	current	optimum		current	optimum	
		estimate	(range)[a]		estimate	(range)[b]
			(thousands of fish)			
Nass River (odd)	844	unknown	unknown	130	unknown	unknown
(even)	1,440	unknown	(600 - ?)	278	unknown	(200 - ?)
Skeena River (odd)	854	1,220	(1,000 - ?)	1,120	701	(500 - 900)
(even)	294	1,140	(1,000 - ?)	700	600	(500 - 1,000)
Central coast (odd)	1,340	3,650	(2,500 - ?)	1,020	3,280	(2,000 - ?)
(even)	4,310	10,100	(8,000 - ?)	3,300	5,160	(3,000 - ?)
Johnstone Strait (odd)	790	800	(1,000 - ?)	600	600	(400 - 1,000)
(even)	2,620	unknown	(1,000 - ?)	1,350	unknown	(1,000 - ?)
Strait of Georgia (odd)	190	665	(350 - 2,000)	86	362	(250 - 2,000)
Fraser River (odd)	7,000	4,000	(3,500 - 8,000)	2,440	2,000	(1,500 - 6,000)
Queen Charlotte, North (even)	41	1,000	(900 - 2,000)	251	750	(600 - 2,500)
Queen Charlotte, South (even)	1,065	1,020	(500 - 1,100)	692	576	(400 - 1,000)
Rivers/Smith Inlet (even)	468	1,120	(600 - ?)	193	155	(100 - ?)
S.W. Vancouver Island (even)	43	unknown	(35 - ?)	7	unknown	(25 - ?)
N.W. Vancouver Island (even)	128	unknown	(200 - ?)	131	unknown	(150 - ?)
total: odd years	11,018	11,179+		5,396	6,943+(?)	
even years	10,409	18,611+		6,902	7,241+(?)	

[a] The ranges reflect uncertainty about optimum exploitation rates and a lack of knowledge about the spawner-recruitment relationship.

[b] The ranges reflect both uncertainty over escapement, problems with interception in other fisheries and perceived difficulties in effectively harvesting the available surplus from each substock.

Table D-3 shows that the current pink catches average between 10 million in even years and 11 million in odd years. Optimum catches were not estimated for all production areas, primarily because of extreme uncertainty in optimal escapement estimates. But, to obtain a rough perspective on the overall potential pink catches for those areas where an optimum catch is not estimated, the optimum has been assumed to be equal to the current. With this assumption, the potential is some 18.6 million fish for even years and 11.2 million for odd. Some opportunites for substantial catch increases have been identified, particularly in the central coast and Johnstone Strait areas.

The data on optimum escapement indicate that the lower range of the estimate for the Skeena River is below the current levels, which implies that exploitation rates are also presently below the optimum. Increased escapements are indicated as optimal on the central coast in keeping with the indication of significant potential harvests for that area. In other areas the current and optimum estimated escapement figures are not badly out of balance, particularly in view of the wide ranges in the optimum estimates.

Coho

Table D-4 Current and optimum catch and escapement of coho salmon originating in Canadian rivers estimated by major production area

	catch			escapement		
area	current	optimum		current	optimum	
		estimate	(range)		estimate	(range)[a]
			(thousands of fish)			
Queen Charlotte, North	74	140	(120 - 240)	70	35	(15 - 75)
Queen Charlotte, South	52	100	(50 - 110)	48	80	(50 - 140)
Nass River	61	120	(70 - 140)	26	30	(10 - 60)
Skeena River	96	130	(120 - 180)	35	54	(10 - 120)
Central coast	337	670	(550 - 800)	127	135	(80 - 240)
Rivers/Smith Inlets	94	180	(120 - ?)	5	10	(4 - ?)
Johnstone Strait	530	580	(250 - 700)	52	100	(40 - 180)
Strait of Georgia	630	567	(400 - 600)	155	201	(100 - 400)
Fraser River	380	406	(370 - 400)	61	54	(20 - 100)
S.W. Vancouver Island	135	150	(100 - 160)	48	100	(50 - 200)
N.W. Vancouver Island	116	125	(100 - 125)	27	35	(20 - 50)
total:	2,505	3,168	(2,250 - 3,455 +)	654	834	(399 - 1,565+)

[a] The ranges around the estimate reflect lack of knowledge about spawner-recruitment relationships and uncertainty about optimal rates of exploitation.

Table D-4 shows that current catches of 2.5 million coho annually are below the estimated optimum of 3.2 million, indicating a possible expansion in catches of 0.7 million fish. Opportunities for increases appear to be most significant in the central coast and northern areas, with the catches from the southern areas generally being close to the indicated optimum.

Comparison of current and estimated optimum escapement levels indicates that, except for the Queen Charlottes' northern area, escapement should be increased. The required increase is not dramatic in any area, although the relatively small numbers in the coho stocks may tend to mask the fact that, for some stocks, the proportionate increase is quite large.

Chinook

Table D-5 Current and optimum catch and escapement of chinook salmon originating in Canadian rivers estimated by major production area

	catch			escapement		
area	current	optimum		current	optimum	
		estimate	(range)		estimate	(range)[a]
			(thousands of fish)			
Nass River	13	27	(20 - 26)	7	8	(6 -10)
Skeena River	19	25	(20 - 30)	22	22	(20 - 50)
Central coast	44	56	(50 - ?)	29	30	(16 - 50)
Rivers/Smith Inlets	29	33	(25 - 30)	3	4	(3 - 8)
Johnstone Strait	64	61	(50 - 60)	17	18	(10 - 30)
Strait of Georgia	70	62	(40 -50)	19	32	(20 - 50)
Fraser River	578	788	(700 - 1,200)	68	200	(100 - 400)
S.W. Vancouver Island	62	unknown	unknown	15	unknown	unknown
total:	879	1,052+	(905+ - 1,396+)	180	314+	(175+ - 598+)

[a] The ranges are wide because of uncertainty about rates of recruitment from various levels of spawner abundance and the optimal rates of exploitation.

Table D-5 shows that current catches of chinook are estimated to be some 880 thousand annually, with the optimum not significantly greater at about 1.1 million. Compared to the other species, the size of the chinook stocks is small, and the only substantial opportunity for increase is in the Fraser River system where it is estimated that current catches of some 578 thousand could be increased to reach 788 thousand. The present Fraser stocks will not support harvests of this level, however, and they can only be achieved if the stocks are rebuilt through increased escapements. Throughout the coast there is concern that exploitation rates may be excessive and that catches must be curtailed until management information is significantly improved and the stocks can be managed with greater certainty.

The estimates of current and optimum chinook escapements appear deceptively simple, probably because the numbers are so small by comparison with the other species. The indicated optimum spawning requirements are not far from the current levels in most areas, with the notable exceptions being the Fraser system (200 thousand versus 68 thousand) and the Strait of Georgia.

FOOTNOTES

1. For the years preceding 1920, data were obtained from Sixty-First Annual Report of the Fisheries Branch. Department of Marine and Fisheries, Ottawa, 1928. pp. 86-87. (Production is reported in packed cases; the following pieces per case are used for conversion: sockeye, chum and coho — 13 pieces per case; chinook — 7 pieces per case; pink — 20 pieces per case); for the period 1920 to 1976, from Historical Catch Statistics for Salmon of the North Pacific Ocean. International North Pacific Fisheries Commission, Bulletin No. 39, Vancouver, 1979. Table 63; for 1977 to 1980 from Annual Summary of British Columbia Catch Statistics 1980. Department of Fisheries and Oceans, Vancouver, 1981.

2. Environmental and Social Systems Analysts Ltd., An Assessment of Stocks and Management Problems of the Commercial Fisheries of Canada's Pacific Coast. Commission on Pacific Fisheries Policy, Research Document R-3, Vancouver, January 1982.

3. E. H. Vernon, Fraser River Sockeye: The Stocks and Their Enhancement. Department of Fisheries and Oceans, Vancouver, January 1982.

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